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USSR Report

AGRICULTURE

(FOUO 9/82)

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LIVESTOCK FEED PROCUREMENT

NEW INTERFARM ORGANIZATIONS FOR FEED PRODUCTION

Moscow KORMOPROIZVODSTVO in Russian No 4, Apr 82 pp 1-3

/Article: "To Increase Feed Production on the Basis of Interfarm Cooperation"/

/Text/ As noted in "Basic Directions in the Economic and Social Development of the USSR for 1981-1985 and for the Period Until 1990," a fundamental improvement in the feed base, a full satisfaction of the needs of public animal husbandry and of livestock privately owned by citizens for feed and lending a sectorial specialized nature to feed production are the basis for the further development of animal husbandry and increase in its productivity.

A number of highly efficient, new organizational forms based on the principles of specialization and cooperation for the purpose of providing large interfarm complexes and specialized farms of kolkhozes and sovkhozes with feed have emerged in the country's feed production in the last few years.

Interfarm enterprises for feed production. A total of 148 such enterprises operated in the country at the beginning of 1980. This form of organization of feed production was most developed in the Moldavian SSR, the Ukrainian SSR, the Belorussian SSR, in Bryanskaya, Voronezhskaya, Rostovskaya, Tul'skaya and Tambovskaya Oblasts and in Krasnodarskiy Kray in the RSFSR.

More than 1.6 million hectares of agricultural land, including 670,000 hectares of arable land, were assigned to interfarm enterprises for feed production. In 1980 they produced 217,000 tons of hay, 1.7 million tons of silage, 662,000 tons of haylage, 190,000 tons of fodder root crops, 3 million tons of green feed and 880,000 tons of grain. A total of 2.7 million tons of fodder units were obtained. Furthermore, these enterprises provided great help to kolkhozes and sovkhozes in the procurement and processing of feed and in its transportation from fields to farms.

Practice has shown that under the conditions of interfarm cooperation land areas are utilized more efficiently. In 1980 these enterprises gathered an average of 39 quintals of hay of perennial grass, 247 quintals of fodder root crops, 28 quintals of grain and 253 quintals of the green mass of perennial grass per hectare.

In the Moldavian SSR such enterprises were established in every rayon. A total of 210,000 hectares of land areas were assigned to them. In 1980 they accounted for more than one-half of the total amount of hay, silage and fodder root crops procured by the republic's kolkhoz-cooperative sector.

The Yur'yevskoye Interfarm Enterprise for Feed Production organized by kolkhozes in Chimishliyskiy Rayon in the Moldavian SSR in 1975 attained good production indicators. A total of 19 percent of the rayon's fodder land was assigned to this enterprise, which produces more than 27 percent of the feed procured in the rayon. In 1980 a total of 52.4 quintals of fodder units per hectare were gathered there, which was 11.1 quintals more than the average on the rayon's kolkhozes. The enterprise fully provides the Chimishliyskiy Interfarm Animal Husbandry Complex with feed. Owing to the increase in the productivity of land areas transferred to the interfarm enterprise, animal husbandry indicators are improving. For example, during the 10th Five-Year Plan, as compared with the Ninth Five-Year Plan, the gross production of milk in the rayon increased by 41 percent and of beef, by 71 percent.

In the Belorussian SSR interfarm enterprises for feed production carried out the entire set of amelioration operations on the land assigned to them. This enabled them to gather an average of 25.2 quintals of fodder units per hectare in 1980, which was almost five times as much as the amount obtained by kolkhozes and sovkhozes on this land before the organization of these enterprises.

The Ola Interfarm Enterprise in Zhlobinskiy Rayon, Gomel'skaya Oblast, organized by six farms in the rayon in 1975 operates efficiently. A total of 2,300 hectares of land, of which about 2,000 hectares were peat bogs and water-logged sections, were assigned to it. Before the establishment of this enterprise this land was hardly used. Even if a negligible amount of feed was procured there, owing to the great expenditure of manual labor, it was very expensive for farms. The enterprise carried out work on the drainage and cultivation of soil on the entire area assigned to it, as a result of which the productivity of land increased almost sixfold. In 1980 a total of 34.4 quintals of fodder units per hectare were gathered there.

A total of 16 interfarm enterprises for feed production now operate in the republic. The Maydan Enterprise in Khoynikskiy Rayon and the Pripyat' Enterprise in Mozyrskiy Rayon, Gomel'skaya Oblast, and others have attained good economic production indicators for a number of years. Another 101 enterprises are to be organized by the end of the five-year plan, which will make it possible to produce up to 2.9 million tons of fodder units, or 13 percent of the total volume of their procurement in the republic, in these types of interfarm formations alone.

Many feed producing interfarm enterprises in the RSFSR attain high indicators. The Poyma Interfarm Enterprise, which makes use of more than 7,000 hectares of flood plain land, has operated in Suvorovskiy Rayon, Tul'skaya Oblast, for 6 years. In 1980 the enterprise procured on this land 72 percent of the silage, 67 percent of the hay and 84 percent of the grass meal obtained in the rayon. During the period of the enterprise's activity feed production in the rayon increased by 23 percent, which had a certain effect on the growth of livestock products. Throughout the rayon during the indicated period the production of milk increased by 32 percent and of meat, by 34 percent.

The Donskoye Interfarm Enterprise for Feed Production was organized on the flood plain land of nine kolkhozes in Rossoshanskiy Rayon, Voronezhskaya Oblast, in 1978. More than 4,000 hectares of land areas were assigned to this enterprise. The enterprise together with member farms carried out amelioration operations on this

land, which made it possible to sharply raise its productivity. In 1980 the enterprise procured 11,000 tons of hay, 75 percent of which was of the first and second category, and transferred them to cooperative member farms.

Interfarm enterprises for the use of flood plain land were also established in Rostovskaya, Bryanskaya, Kaluzhskaya, Gor'kovskaya and a number of other oblasts in the RSFSR.

Interfarm plants and shops for the production of mixed feed and feed mixtures. There were 555 such enterprises in the country at the beginning of 1981. They became widespread in the Ukrainian SSR, the Moldavian SSR, Krasnodarskiy and Stavropol'skiy Krays and Rostovskaya, Kurganskaya, Penzenskaya and other oblasts in the RSFSR. In 1980 they produced about 10 million tons of mixed feed and feed mixtures and in 1981, more than 11 million tons.

A whole network of interfarm enterprises for the production of mixed feed and high-grade feed mixtures was established in the Ukrainian SSR. A total of 6,000 kolkhozes and 550 sovkhozes took part in their organization. In 1980 all the republic's interfarm enterprises produced 7.3 million tons of mixed feed and feed mixtures. In Vinnitskaya Oblast alone during the 10th Five-Year Plan the production capacities of interfarm mixed feed plants increased more than fourfold and the average annual production of mixed feed totaled 359,000 tons, as compared to 77,000 tons during the Ninth Five-Year Plan. The output of mixed feed at interfarm plants is to be increased to 1 million tons in the oblast by the end of 1985. This means that the grain allocated for feed for livestock will be processed into mixed feed and high-grade feed mixtures.

The Gulyaypole Interfarm Mixed Feed Plant in Zaporozhskaya Oblast built with the contributions of 15 farms in the rayon has operated since 1972. The plant annually produces 20 to 25 percent more output than envisaged by the technical and economic substantiation. For example, in 1980 a total of 30,400 tons of mixed feed, whose production cost was 85.4 rubles, was produced there.

In Kurganskaya Oblast in 1976, having pooled their capital, 170 farms built 13 interfarm mixed feed plants of a total production capacity of 550 tons of output per shift. In addition to mixed feed, the production of additives--meat-bone and grass meal--was organized at plants. In 5 years the oblast's interfarm plants produced more than 800,000 tons of high-grade mixed feed. The production cost of 1 ton of this mixed feed was 67 to 75 rubles.

The advantages of cooperation in the organization of mixed feed production are well illustrated by the Al'menevskiy Mixed Feed Plant in Kurganskaya Oblast. After the commissioning of this plant member farms liquidated 28 centers for the grinding of feed grain. As a result, more than 100 kolkhoz members and sovkhoz workers were freed for employment in other operations. The feeding of public livestock improved. During the period of activity of this enterprise the expenditure of concentrated feed on member farms was reduced by 14 percent per quintal of milk and by 11 percent per quintal of beef.

Kolkhozes and sovkhozes performing production functions of interfarm enterprises for the production of livestock products with their own feed. About 2,500 such farms operated in the country at the beginning of 1981. This form of cooperation

became most widespread in the RSFSR, the Ukrainian SSR, the Belorussian SSR and the Kazakh SSR. The division of labor among cooperative member farms is mutually advantageous. The head enterprise uses the land areas assigned to it only for feed production and member farms undertake the obligations for the fulfillment in its behalf of the state plan for the sale of plant products.

Practice shows that such a form of cooperation in the organization of feed production and in the production of livestock products is highly efficient. Since 1974 the Kolkhoz imeni Uritskiy in Gomel'skiy Rayon, Gomel'skaya Oblast, has performed production functions of an interfarm enterprise for the raising and fattening of large-horned cattle with its own feed. The farm efficiently uses every hectare of land, from which 60 to 80 quintals of fodder units are obtained and with irrigation, 100 to 110 quintals of fodder units. The establishment of the interfarm enterprise for the raising and fattening of large-horned cattle with its own feed made it possible to increase beef production in the rayon 1.5-fold in the last 7 years, at the same time, lowering labor expenditures per quintal of weight gain by 30 percent. During the indicated period the profitability of beef production in the rayon comprised 31 percent, which was twice as high as the average in the oblast.

This positive experience in cooperation in the organization of the fattening of livestock with the feed of enterprises approved by the board of the USSR Ministry of Agriculture and by the Presidium of the Central Committee of the Trade Union of Agricultural Workers has become widespread. More than 50 farms now operate according to the above-mentioned principle in the Belorussian SSR. The Donguzlovskiy Sovkhoz in Chelyabinskaya Oblast, the Kolkhoz imeni Ol'minskiy In Belgorodskaya Oblast, the Progress and Sala sovkhozes in the Latvian SSR, the Ligumay and Shaukotas kolkhozes in the Lithuanian SSR and many others efficiently apply this principle of cooperation.

Kolkhozes and sovkhozes specialized in feed production on a cooperative basis. These farms (there are about 100 such farms in the country) grow feed for large interfarm animal husbandry complexes. Cooperative member farms fulfill in their behalf the plan for the sale of agricultural products to the state. Such specialized farms exist in Voronezhskaya, Tambovskaya and Rostovskaya Oblasts, Stavropol'skiy and Krasnodarskiy Krays, the Ukrainian SSR and other republics. For example, in Tambovskaya Oblast since 1972 the Sovkhoz imeni 60-Letiya VLKSM has engaged in feed production for the Novolyadinskiy Interfarm Complex for the Fattening of Large-Horned Cattle. The member farms of this interfarm enterprise undertook the obligations for the fulfillment in its behalf of the plans for the sale of grain, milk and other agricultural products to the state. This enabled the sovkhoz to revise the structure of sown areas with due regard for its specialization in the production of fodder crops. To ensure stable harvests, agricultural reclamation work ensuring an annual irrigation of more than 1,500 hectares of land was carried out on the sovkhoz. All this had a positive effect on the growth of the yield of fodder crops. Whereas before specialization 12 to 13 quintals of fodder units per hectare of arable land were gathered on the sovkhoz, in 1980 a total of 45 quintals and from irrigated plots 63 quintals were obtained, which was 23 and 36 quintals of fodder units respectively higher than the average in the rayon. In 1980 the production cost of 1 quintal of fodder units was 7.5 rubles, which was 23 percent lower than the average rayon indicator.

In Vinnitskaya Oblast the Kolkhoz imeni 21 S'yezda KPSS efficiently manages feed production on an interfarm basis. This farm grows feed for the Tul'chin Interfarm Enterprise for the Raising and Fattening of Large-Horned Cattle. More than one-half of the arable land is occupied by fodder crops here. In the structure of fodder crops perennial grass occupies 50 percent, corn for silage, 35 percent and pulse and fodder root crops, 15 percent. Such a structure with the high output of feed per hectare makes it possible to fully meet the need of the interfarm enterprise for feed in the necessary assortment. Changing over to specialization, the kolkhoz began to stably gather 65 to 80 quintals of fodder units per hectare, which was 1.5 times as much as the average indicator in Tul'chinskiy Rayon.

The Kolkhoz imeni Lenin in Annenskiy Rayon, Voronezhskaya Oblast, the Put' k Kommunizmu Kolkhoz in Mtsenskiy Rayon, Orlovskaya Oblast and the Erken-Yurtskiy Sovkhoz in Adyge-Khabl'skiy Rayon, Karachayevo-Cherkesskaya Autonomous Oblast, attained high economic production indicators in feed production on a cooperative basis.

The economic relations between member farms and interfarm enterprises are regulated by the contracts concluded between them. This document determines the amount and assortment of feed and the dates of its delivery by specialized farms to animal husbandry complexes, as well as the responsibility of the parties for the fulfillment of contractual obligations by them.

At the same time, an analysis of the state of affairs shows that there are still a number of significant shortcomings in the development of the process of organization of feed production on the basis of the principles of interfarm cooperation. Despite the definite advantages of specialization of feed production on the basis of interfarm cooperation these opportunities are not utilized sufficiently in some republics, krays and oblasts. For example, work on the organization of specialized feed producing interfarm enterprises on flood plain land is carried out at slow rates in the Russian Federation, the Ukrainian SSR, the Lithuanian SSR and the Latvian SSR. Individual farms are unable to develop such land. Therefore, flood plain land is not utilized efficiently.

When feed producing interfarm enterprises are organized on flood plain land, sometimes an insufficiently clear technical and economic substantiation is given, as a result of which such enterprises develop slowly, have a weak material and technical base and do not cope with the production program. For example, for this reason during the 4 years of its activity the Vytebet' Interfarm Enterprise in Khotynetskiy Rayon, Orlovskaya Oblast, developed only 250 out of the 3,000 hectares of flood plain land envisaged according to the technical and economic substantiation. In practice, the material base of this enterprise was not established. In 1980 it procured only 360 tons of fodder units.

Some local agricultural bodies do not pay proper attention to the development of feed production in interfarm formations fattening livestock with their own feed. In some cases low-fertility land and land located far away are assigned to such farms. For example, land located at a distance of 45 to 50 km from animal husbandry complexes was assigned to the Labinsk and Korenevo livestock fattening interfarm enterprises in Krasnodarskiy Kray. This not only hampers the organization of feed production, but also raises the cost of feed delivery to the complexes.

Economic production relations between feed producing interfarm enterprises and cooperative member farms have not been adjusted everywhere. The Podberezovskoye Interfarm Enterprise in Mtsenskiy Rayon, Orlovskaya Oblast, can be cited as an example. In 1980 it turned over 5,500 quintals of granulated grass meal to the Novyy Put' Kolkhoz--a cooperative member. The kolkhoz paid the enterprise 10.1 rubles per quintal of granules--this without taking into account the cost of the green mass delivered by the kolkhoz. The production of 1 quintal of grass meal required the expenditure of 6 quintals of this mass worth (together with transport costs) 8.2 rubles. Thus, 1 quintal of granulated feed cost the kolkhoz 18.3 rubles and 1 quintal of fodder units contained in this feed, 30.5 rubles. Such unprofitable conditions cannot stimulate the development of feed production on an interfarm basis.

What should be done to more successfully develop feed production on the basis of the principles of interfarm cooperation and to lend a specialized industrial nature to this sector? The agricultural bodies of republics, krays and oblasts should primarily direct their efforts toward an accelerated development of flood plain land and organization of specialized feed producing interfarm enterprises on it, as well as an increase in the efficiency of utilization of land areas by farms fattening livestock on a cooperative basis with the use of feed of their own production. Flood plain land should be transferred to interfarm enterprises for feed production for a long-term use and, at the same time, the necessary material and technical base should be created.

It is necessary to take measures to further improve the mechanism of economic production relations between feed producing interfarm enterprises and cooperative member farms, paying special attention to the economic substantiation of the accounting prices of products handed over by interfarm enterprises to member farms.

The experience of advanced feed producing interfarm enterprises, interfarm mixed feed plants and kolkhozes and sovkhozes performing production functions of interfarm enterprises in the fattening of livestock and raising of heifers with the feed of their own production should be more widely disclosed and popularized.

A creative utilization of the forms of interfarm cooperation that have proved their value will give this process an even greater scope and will make it possible to make it a reliable means of increase in the production of feed and livestock products during the current five-year plan.

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AGRO-ECONOMICS AND ORGANIZATION

CEMA CONFERENCE DISCUSSES AGROINDUSTRIAL COMPLEX, FOOD SUPPLY

Moscow VOPROSY EKONOMIKI in Russian No 4, Apr 82 pp 155-156

[Article by M. Bukh: "The Economic Mechanism and the Food Supply of CEMA Nations"]

[Text] Urgent problems regarding an improvement in the economic mechanism within the agroindustrial sphere of the economies of CEMA nations were examined in September 1981 in Moscow at an international conference having the theme, "The Role of the Economic Mechanism in Improving the Food Supply of CEMA Nations." Participating in the conference, which was organized by IEMSS [Institute of Economics of the World Socialist System] of the USSR Academy of Sciences, were representatives of Bulgaria, Hungary, the German Democratic Republic, Poland, the USSR and Czechoslovakia.

The speeches that were presented resulted in a lively discussion, the subject of which were the scientific and applied aspects of strengthening the effectiveness of the economic mechanism in increasing production efficiency within the agroindustrial sphere. In his introductory speech Doctor of Economic Sciences K. Mikul'skiy (IEMSS of the USSR Academy of Sciences) underscored the importance of the economic mechanism as a capitol-saving factor in achieving great final results while developing the agroindustrial sphere of the economy.

Many speakers touched on the problems of methodology and planning practices of the APK [agroindustrial complex]. Scientific research by the economists of socialist countries and a generalization of the experience regarding the functioning of the economic mechanism within the agroindustrial sphere indicate that the main directions to be taken to improve APK planning involve a closer adherance to the principle of democratic centralism and the elimination of excessive regulations in the planning and economic work of local production links (D. Vladov, Bulgaria; M. Bukh, USSR). Recently CEMA has realized or planned measures to strengthen the economic basis of planning and to include agricultural enterprises and agroindustrial associations in planning and economic activities. Economic levers, interests and stimuli are being utilized more actively in formulating and realizing planning decisions and specific aims and the economic independence of enterprises is on the increase (I. Benet, Hungary). The great role of the system of economic agreements in planning and administrative activities within the framework of the APK was emphasized at the conference (P. Trifonov, Bulgaria, and others).

On a macrolevel an improvement in APK planning presupposes a transition from the branch to the complex interbranch principle of plan formulation and realization. Only in such a way will it be possible to achieve a coordination of branch and interbranch questions. The development of an overall program for APK elaboration and individual subprograms will enable us to correctly substantiate the volume of capital investments and material, financial and labor resources (I. Karlyuk, USSR; E. Divila, Czechoslovakia). The development of a food program in the USSR can serve as an example for creating an overall complex APK program. The most important thing in improving the economic mechanism of the APK is the orientation of all links toward the final results and the stimulation of links according to the degree to which they have satisfied demand and effectively used resources (V. Mozhin, E. Krylatykh, USSR). It was noted at the conference that the most important factor in developing and realizing a food program is solving the social problems of the village (L. Nikiforov, USSR).

Several of the reports and speeches touched upon questions concerning the organizational-administrative structure of the APK. E. Divila (Czechoslovakia) noted that in some countries an organizational-administrative unification of the second and third spheres of the APL has been effected by creating single ministries of agriculture and the processing industry. He noted, however, that in Czechoslovakia for example, the effectiveness of such a ministry was inadequate. In the USSR a promising organizational form for the developing APK, especially in the Baltic States, is the rayon agroindustrial association (RAPO). RAPO's are being formed in all regions of the Estonian SSR. In an organizational sense the RAPO unifies all agricultural, agricultural service and processing enterprises. A RAPO council serves in the administrative function (E. Khyayal, USSR).

At the conference a question was raised concerning the place of private enterprises within the structure of the APK. It was emphasized that as far as organization was concerned they had to become an integral part of the country's APK by means of efficient specilization (B. Tompa, Hungary). The speech of the administrative chairman of Tsentrosoyuz [Central Union of Consumers' Societies, USSR], A. Smirnov, noted that organizational consumer cooperation is an integral part of the country's APK. The attention of the conference participants was also directed toward the fact that the organizational formulation of the APK on both a macro and a micro level cannot be effective (or even possible) without the institutionalization of the corresponding legal norms and statutes (M. Kozyr', USSR).

The effective use of all economic factors (cost as well as non-cost) and the strengthening of cost accounting on this basis are the most important conditions for the growth and increased effectiveness of the APK. At the conference a great deal of attention was given to discussing the problems of price formulation. To a significant degree because of the imperfections in prices, cost accounting within the systems of APK's of some CEMA countries has not yet become an operable method of effective production planning and management. Several proposals concerning improving APK price formulations were made. Planning prices must reflect the influence of objective factors on expenses and public costs (I. Kukinov, USSR). A. Kalnynysh (USSR) discussed the necessity of raising the validity of procurement prices, of developing a single methodology for projecting agricultural procurement prices and industrial wholesale prices, and of establishing procurement prices on the basis of the normative levels of profit.

The problem of reproducing natural resources provoked a great deal of discussion (M. Lemeshev, USSR). Most of the conference's participants agreed that it is essential to establish active economic incentives to reproduce natural resources (payments for the use of such resources).

In consideration of the importance of further improving the administrative mechanism as well as of the controversial nature of several of the questions raised, the participants in the conference decided that it would be expedient to continue the discussion and to devote the next conference in one of the CEMA member nations to the same theme.

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AGRICULTURAL MACHINERY AND EQUIPMENT

WIDE INTRODUCTION OF OVERALL MECHANIZATION IN AGRICULTURE URGED

Moscow VOPROSY EKONOMIKI in Russian No 4, Apr 82 pp 93-101

/Article by Iosif Shabsayevich Barg, chief economist of the All-Union Scientific Research Institute of Economics of Agriculture; Vladimir Mikhaylovich Logachev, candidate of economic sciences, scientific secretary of the Scientific Council of the State Committee for Science and Technology on the problem "Organization and Economics of Scientific and Technical Investigations and Developments;" and Leonid Vasil'yevich Lozhkin, candidate of economic sciences, manager of a sector of the All-Union Scientific Research Institute of Economics of Agriculture: "Efficiency of Overall Mechanization in Agriculture"/

/Text/ The rise in the people's well-being and elimination of the differences in the standard of living and way of life of the rural and urban population result from the change in the nature of labor in agricultural production and its transformation into industrial-type labor. The accelerated development of equipment and improvement in the technology and organization of production taking place under present conditions are connected with the industrialization of agriculture and its transfer to a modern industrial basis.

An overall mechanization of production processes and a rational utilization of equipment are important conditions for the fulfillment of the tasks of attaining a dynamic development and increase in the efficiency of all agricultural production sectors set in "Basic Directions for the Economic and Social Development of the USSR for 1981-1985 and for the Period Until 1990." A successful solution of the problems of social and economic development of agriculture is possible only through a wide introduction of new technologies and machine systems.

A machine system implies a technological set of machines interconnected in their basic type sizes and productivity in successively performed processes and operations. A machine system as the nucleus of an overall mechanization of agricultural production ensures a prompt high-quality performance of the necessary operations in plant growing and animal husbandry on the basis of progressive and advanced technology with the lowest expenditures of labor and means of production per unit of output. At the same time, technology becomes the main connecting link in the combination of science with production. A machine system includes a minimal number of types and brands of tractors and other agricultural machines and implements designed for their maximum utilization during the year.

The efforts of scientific institutions and design organizations are directed toward an increase in the power saturation of tractors, in the speed and width of cut of units, in the carrying capacity of harvesting machines and in the loading capacity of means of transportation. There is a scientific search for the development of fundamentally new machines with active working elements and with the use of hydrodynamic and aerodynamic, not only mechanical, principles in designs. Work on the unification of machinery and equipment is also carried out. The development of combined machines performing several operations per pass has great prospects.

The introduction of the achievements of scientific and technical progress and the intensification of agriculture are inseparably connected with the growing consumption of electric power in production processes, which advances the task of development of improved electric appliances and electrified and automated machinery and equipment, of their introduction into agricultural production and of an increase in the reliability of electric supply for agriculture.

The development of power saturated tractors was a major contribution of science to an increase in the efficiency of agricultural production. This opened up great possibilities for the growth of labor productivity and the performance of field work at the best agrotechnical time. The new equipment makes it possible to increase operating speeds to 10 or 15 km per hour and to raise the productivity of units 1.5- to 2-fold.

Much attention is paid to the equipment of agriculture with modern agricultural combines. Work has begun on the modernization of the Niva and Kolos grain harvesting combines, elimination of their structural shortcomings and increase in their carrying capacity to 6.5 and 9 kg of grain per second (in existing combines, 5 to 7 kg of grain per second). The Sibiryak combine has been modernized. For the purpose of the development of feed production the capacities of plants manufacturing equipment for the procurement and processing of feed are being expanded and the production of self-propelled and trailed fodder harvesting combines, highly efficient mowers, mincers, roller pickup pressers, milking installations and other machines is being increased.

The further mechanization of agriculture will be carried out through the development and introduction of advanced, new technologies and the retooling of the sector on the basis of the use of machine systems. The output of more productive, new agricultural tractors with a service life of 6,000 hours until major repairs and with improved working conditions of machine operators is envisaged. Their utilization will make it possible to increase the productivity of machine and tractor units 1.5- to 1.8-fold as compared with existing models. For the purpose of an overall equipment of kolkhozes and sovkhozes with modern machinery, at the same time, work on the development of the necessary set of agricultural machines for these tractors is carried out.

New technological processes of grain production with the use of highly productive combines with a carrying capacity of 10 to 12 kg of grain per second, as well as mechanization equipment for the nongrain part of the harvest, are being developed. The use of these machines will contribute to a rise in the standard of farming and increase in the gross output of grain, while labor expenditures will decrease to two-thirds or one-half.

Plans are made for the development of new technological processes and technical facilities in sugar beet and cotton growing and in potato and vegetable production, whose introduction will make it possible to reduce labor expenditures on the production of products and to raise their gross output and quality.

Highly efficient technological processes, sets of machinery and equipment and plans for buildings and installations envisaging an overall mechanization and automation of production processes are being developed in animal husbandry. This will make it possible to lower labor expenditures on the production of 1 quintal of milk to 0.8 or 1.0 man-hour and on 1 quintal of weight gain in beef, to 2.5 or 3.0 man-hours and of pork, to 1.5 or 2.0 man-hours.

In connection with the growth of the pool of machinery and equipment the development and introduction of highly efficient methods of utilization of the machine and tractor pool on kolkhozes and sovkhozes acquire great importance. A program of work on the development of an overall system of repair and technical servicing of equipment on the basis of the further improvement and development of the repair base, rise in the technical level and quality of repairs and use of equipment for the diagnosis of the technical state of machines without dismantling them has been approved.

Modern industrial methods of construction of waterworks making it possible to increase labor productivity and to lower the cost of construction by 25 to 30 percent are being developed. Systems of mechanized and automated sprinkling installations, which will increase labor productivity in irrgation 1.5- to 3-fold, as well as systems of subsoil and drip irrigation and drainage-moistening systems with various types of drainage and moistening techniques, are being developed.

The July (1978) Plenum of the CPSU Central Committee set the task of "completing the overall mechanization of cultivation of all the major agricultural crops and raising the level of mechanization of animal husbandry much higher" during the 11th Five-Year Plan. At present only 80 percent of the standard need of agriculture for tractors, two-thirds, for grain combines, a little more than four-fifths, for potato harvesting combines, two-thirds, for general-purpose plows, one-fifth, for straw mincers, 70 percent, for grain seeders, 60 percent, for sugar beet harvesting combines, 10 percent, for machines for the picking and transportation of hay bales, 25 percent, for manure distributors and 60 percent, for mineral fertilizer spreaders is met.

As yet the machine and tractor pool is growing slowly, because the overwhelming part of the agricultural equipment is assigned for compensation for physical withdrawal. This is due to the insufficient skill level of machine operators, lack of their interest in the preservation of equipment, poor supply of farms with spare parts in the required quantity and nomenclature and low quality of equipment repairs. During the 10th Five-Year Plan the rates of increase in the tractor pool comprised only 2.7 percent and their total capacity rose by only 34.7 million hp, which was equal to its increase during the Ninth Five-Year Plan, and in the last few years there has even been a reduction in the rates of increase. Only 5 to 8 percent of the new grain harvesting combines are assigned for an increase in the pool. During the 10th Five-Year Plan it comprised less than 5 percent.

In his report at the 26th CPSU Congress N. Tikhonov stressed that "during the new five-year plan it is necessary to rectify the situation with the quality of agricultural equipment, which now gives rise to unfavorable criticism, and to see to it that it meets the highest requirements." This applies primarily to the reliability, productivity, maintainability and technological effectiveness of machines. The frequent breakdown of agricultural equipment and the high labor intensiveness of its repair and technical servicing are the reasons for the fact that the coefficient of utilization of net time in a work shift is 0.45 in combines and 0.56 in tractors. At the actual level of reliability of equipment the expenditures on its maintenance in agriculture during the depreciation period greatly exceed the expenditures on its acquisition. For example, out of the combined monetary expenditures on output and repair and technical servicing the manufacture of tractors accounts for 23 to 34 percent and the remaining 66 to 77 percent (more than 5 billion rubles annually) are used for repair and technical servicing during the period of their operation. Additional expenditures on an improvement in the quality of machines ensure a much greater saving of funds than on their repair and technical servicing.

Under the conditions of transfer of agriculture to an industrial basis and drawing of substantial raw material and fuel-power resources into production the most economical and rational utilization of all types of material resources is necessary. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Intensifying the Work on the Saving and Rational Utilization of Raw Material, Fuel-Power and Other Material Resources" envisages "an enhancement of the role of science in the solution of problems of an efficient utilization of all types of material resources and the development and introduction of resource saving equipment and technology." The manufactured models of tractors, combines and other agricultural machines have a high specific metal intensiveness, which is one of the reasons for the delay in their output. Lowering the specific metal intensiveness of wheel tractors to 35 or 50 kg/hp and of caterpillar tractors, to 40 or 60 kg/hp is a realistic task in the very near future.

The increase in the expenditure of fuel per hp per hour in powerful tractors is an undesirable tendency. Models of tractors with economical engines using no more than 160 to 180 g of fuel per hp per hour are needed. It is necessary to ensure the same or multiple life of all the subassemblies and units of tractors and self-propelled machines until the first major repairs (increasing this period to 8.000 hours) and to establish a guaranteed repair service of basic parts and units during depreciation periods.

For many years mobile power engineering has been insufficiently provided with the necessary working machines (during the 1970's their ratio was lowered from 1:1.4 in 1971 to 1:1.3 in 1978), which does not make it possible to perform the work necessary according to the technology of the set within agrotechnical periods, to efficiently utilize tractors and to ensure a low cost of work. According to standards this correlation should be 1:3 (including machines for animal husbandry) and 1:2.6 only for machines in plant growing.

The problem of providing the working machines of the K-701, T-150K and other new high-speed energy saturated tractors with a train (plows, seeders, harrows, cutters and so forth) is especially acute. For example, the T-150K tractor needs a

train of 28 types of machines, but, in fact, about 20 are supplied and according to the volume of deliveries the needs for only 11 to 12 types of equipment are met fully. At present approximately 1,000 types of machinery and equipment necessary for agriculture according to the technology are not produced.

The development of agricultural production urgently requires an accelerated production and introduction of new types of machines surpassing existing machines in productivity many times as a result of their utilization in advanced technological processes, an increase in unit capacity, speed, carrying capacity and width of cut, development of sets of machines for the production of products without expenditures of manual labor, introduction of technological processes with a minimally necessary number of operations, wide utilization of active working elements in the designs of machines and combination of technological operations, hydraulic and electric drives and elements of automation of control and management of technological processes.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Intensifying the Work on the Saving and Rational Utilization of Raw-Material, Fuel-Power and Other Material Resources" (1981) points out the need to ensure an "extensive introduction of scientific and technical achievements directed toward an increase in the efficiency of utilization of structural and other materials and fuel-power and raw material resources and the development of the implements of labor and machine systems necessary for this." In agriculture the fulfillment of these tasks is possible, in particular, as a result of an increase in the capacity of combine hoppers or the production of intermediary accumulators making it possible to save up to one-fourth of the transport facilities for grain deliveries; development of improved pulverizers of chemical plant protection agents lowering their consumption to two-thirds or one-half; increase in the uniformity of application of mineral fertilizers on the basis of the use of improved machine designs, which makes it possible to greatly increase the yield of every utilized fertilizer; introduction of pneumatic seeders, which, according to the estimates of specialists, make it possible to obtain an annual saving of 6 million tons of valuable seed grain.

The intensification of agricultural production necessitates an increase in the rates of its power equipment. To attain an overall mechanization of production processes in plant growing, it is necessary to have no less than 500 hp of total power capacity per hectare of arable land (at present no more than one-half of this capacity is ensured).

The repair and technical servicing of agricultural machines and mechanisms needs to be improved further. For this it is necessary to increase the degree of provision of the material base of repair and technical servicing with spare parts. In 1980, on the average, only 82 percent of the need of agriculture for repair and technical servicing, including 77 percent, for tractor parts and 72 percent, for agricultural machine parts, was met. Only 308 out of 627 types of the scarcest parts were produced in 1980. The enterprises of the USSR State Committee for Supply of Production Equipment for Agriculture hardly restore scarce spare parts. In 1980 parts worth 382,500 rubles, or 11.4 percent of the delivery of new parts, were restored, which is obviously insufficient. For example, in the GDR, 25 percent of the parts are restored and the task of attaining the restoration of 40 percent of the spare parts is set.

To enhance the role and increase the responsibility of machine building enterprises for a prompt and full provision of the entire pool of machines with spare parts it is advisable to envisage the replacement of losses for farms caused by the downtime of equipment owing to the lack of spare parts in the amount of the planned value of a machine-day from the economic incentive funds of enterprises guilty of the underdelivery of spare parts. This also applies to the enterprises of the USSR State Committee for Supply of Production Equipment for Agriculture that do not fulfill the assignments for the restoration of scarce parts. When a guaranteed supply of spare parts is introduced, bonuses should be paid to workers of supply bases depending on the level of satisfaction of the demand of farms for parts, not on the volume of trade turnover, as is done now.

There are serious shortcomings in the repair and technical servicing of agriculture. The repair base of the USSR State Committee for Supply of Production Equipment for Agriculture is largely used not according to purpose. For example, the volume of work on new output and of other operations of repair plants comprises 60 percent and of repair shops, more than 35 percent, whereas the provision of kolkhozes with standard repair shops comprises only 61 percent and of sovkhozes, 57 percent. The development and utilization of the material and technical base of repair and technical servicing must be planned from the standpoint of maximization of the end results of agricultural production and the USSR Ministry of Agriculture should head this work.

Investigations show that, on the average, one sovkhoz or kolkhoz has more than 20 brands of machines, although it is advisable to have no more than three to six. Many brands lead to a decrease in the efficiency of utilization of equipment and to substantial expenditures on its maintenance and operation, because the expenditures on spare parts and repairs and the downtime of units increase and their operation and the training of machine operators become complicated. There is an opinion that, allegedly, the industry's output of tractors of different designs pertaining to the same traction category is the main, if not the only, reason for this. However, the list of tractors necessary for the national economy is substantiated scientifically. The provisions "A System of Machines for an Overall Mechanization of Agricultural Production" have been developed. It has been established that in the country it is necessary to manufacture tractors of 62 type sizes, including more than 50 for agriculture. In 1980, however, tractors of only 30 type sizes were manufactured.

Kolkhozes and sovkhozes receive many powerful tractors and expensive complex machines. Any malfunctions in their operation and, especially, downtime inevitably result in great damage for the national economy. That is why the development of clear recommendations on problems of improvement and increase in the efficiency of organizational forms of equipment utilization and introduction of advanced methods of technical servicing of the machine and tractor pool is an urgent task. A successful solution of the problems concerning the servicing of the machine and tractor pool will have a positive effect on an acceleration of the rates of intensification of agricultural production and will make it possible to ensure a stable growth of the gross output of grain and other types of farm products.

The introduction of an overall mechanization of grain crop harvesting can be examined, using Krasnodarskiy Kray as an example. The proportion of Krasnodarskiy Kray in the Russian Federation makes up 3 percent in the area of arable land and 6 percent

in the gross output of agriculture. More than 5 million hectares of agricultural land, including 4.3 million hectares of arable land, are assigned to kolkhozes and sovkhozes in the kray. On the average, one kolkhoz accounts for about 10,000 hectares and one sovkhoz, 5,000 hectares of arable land. One out of four people employed in the kray's agricultural production is a machine operator.

According to the data of the Krasnodar Scientific Research Institute of Agriculture imeni P. P. Luk'yanenko, 5 calendar days are the best scientifically substantiated harvesting period, during which winter wheat hardly lowers the yield. A delay of 4 or 5 days in harvesting in excess of the indicated period leads to the loss of 2 quintals of grain per hectare and of 10 days, 4 quintals, or 10 to 12 percent. An obligation to harvest grain crops in 7 to 9 calendar days and without losses has been adopted in Krasnodarskiy Kray. During the 10th Five-Year Plan it was possible to attain a significant shortening of the time of reaping and thrashing of grain crops. This task was accomplished through a fundamental reconstruction of the organization and technology of harvesting operations and a large-group utilization of equipment within specialized complexes, which included technological links from the harvesting and thrashing of grain crops to the plowing of semifallow. In the kray in 1980 grain crops were harvested from an area of 2.5 million hectares, including cereals and pulse crops, from an area of about 2 million hectares, corn, from 340,000 hectares and rice, from 220,000 hectares. A total of 15,500 grain harvesting combines, 11,000 reapers, about 40,000 tractors, 45,000 trucks and a great deal of other equipment operated in the harvesting of grain crops. The harvesting area per combine totaled 130 hectares. Owing to the abundant harvest, all combines operated at lowered speeds and were equipped with chaff collectors. As compared with 1979, in 1980 the average daily output per combine increased by 25 percent, totaling 15 hectares, and the grain yield, 55 to 60 tons.

How was equipment used in the 1980 harvest? On most kolkhozes and sovkhozes in Krasnodarskiy Kray equipment was concentrated in 520 harvesting and transport complexes. Harvesting and transport detachments and specialized links for the performance of concomitant operations were established on farms with small areas and an insufficient amount of equipment. The help of the machine and tractor pool of the Kray Agricultural Equipment Association, the Kray Scientific Production Association for Agrochemical Services to Agriculture and other enterprises was enlisted. All the equipment in complexes and detachments was used no less than 20 hours per day. Reaping and combine units were equipped with electric illumination for night operation. As a rule, complexes were formed from the same types of combines, motor vehicles and tractors. Trailers for the collection and transportation of chaff, pushing sweeps, stack movers and other technical facilities were attached to them.

A link for the technical servicing of machines was attached to every harvesting and transport complex and detachment. Its duty was to control the adjustment and to carry out the technological tuning of harvesting units. As a rule, maintenance took place at night time. During the harvesting period the shops, material warehouses and exchange centers of the Kray Agricultural Equipment Association, of kolkhozes and of sovkhozes were transferred to a 24-hour work regime. When the length of operation of the Kolos, Niva and Sibiryak combines was up to 20 hours in a 24-hour period, even advanced machine operators could not ensure the fulfillment of the envisaged output norms. They took measures so that two combine operators worked on every combine. At the same time, their shift was changed in no more than 4 hours. Two machine operators also serviced every tractor and motor vehicle.

The level of technical equipment and mechanization of production at agricultural enterprises and associations does not yet meet the tasks of increase in output and in the rates of labor productivity growth. For example, in 1980 the level of overall mechanization in cattle raising comprised 39 percent, in hog breeding, 61 percent and in poultry breeding, 69 percent. Vegetable planting was mechanized 64 percent. Combines harvested only 43 percent of the areas under potatoes, 90 percent of the areas under sugar beets and 53 percent of the areas under cotton.

The lack of overall mechanization of the production of individual types of agricultural products leads to significant labor expenditures. For example, in 1980 the expenditures of labor on the production of 1 quintal of grain crops (where sowing and harvesting are mechanized 100 percent) totaled 1.4 man-hours on kolkhozes and 1.2 man-hours on sovkhozes, of potatoes, 3.7 and 3.5 man-hours and of vegetables (on open ground), 7.4 and 5.1 man-hours respectively. In potato growing the digging of tubers was mechanized 94 percent and their loading, only 60 percent.

The existing machine system makes it possible to mechanize all the basic processes in the growing and harvesting of potatoes. At present a number of operations (preparation of seeds, grading of the gathered harvest and loading-unloading operations) are still performed manually. Calculations show that the use of flow technology on the basis of an overall mechanization of potato production, as compared with the traditional technology, will make it possible to lower the labor expenditures on these operations to almost one-third, reducing them to 9.6 man-hours per hectare as compared to 55.4 man-hours with the existing technology.

Sugar beets are some of the most labor intensive crops. In labor expenditures they approximately surpass grain crops and sunflower seeds 10-fold and fiber flax, 3 to 3.5-fold. The care of crops, harvesting and loading are the most labor intensive technological processes for these crops. During the care of sugar beet crops the stage of formation of the plant density requires great expenditures of manual labor (33 to 48 man-hours per hectare). A significant saving of labor expenditures on this operation (20 to 25 percent) is attained when the SST-12 seeder designed for precision seeding at small rates is used. A set of machines for the swath harvesting of sugar beets is now being introduced. Their productivity is twice to three times as high as the productivity of the used equipment and the design makes it possible to gather the harvest without additional manual cleaning. The introduction of a machine system for a mechanized cultivation and harvesting of sugar beets could reduce the labor expenditures on this crop to less than one-sixth.

The insufficient provision of agricultural enterprises and associations with technical facilities and their unsatisfactory utilization lead to a prolongation of the performance of work and to a deterioration in its quality, as well as to sizable losses of output, which lowers the efficiency of agricultural production. Shift and daily output in many mechanized operations is smaller than the standard output, the shift coefficient of the operation of machine and tractor units is low and the downtime of machines is considerable.

An analysis of the present utilization of machines shows that both a premature writing off and prolongation of the period of operation of equipment in excess of the standard period occur at agricultural enterprises and associations, which lowers the efficiency of technical facilities. The operation of old equipment raises

the expenditures on maintaining it in an efficient state with a declining productivity. For example, the expenditures on the operation of the T-74 tractor after a standard service life per conventional standard hectare, as compared with the first 2 or 3 years of operation, increase 1.5- to 2-fold and annual output decreases to 40 or 50 percent. Therefore, it is advisable to use old equipment only during stepped-up periods and when there is a shortage of new machines for leveling out peak loads. In the current and five-year plans of enterprises and associations it is necessary to envisage a prompt renovation of the machine and tractor pool, avoiding deviations from the optimum periods of operation.

A universal introduction of industrial technologies of production of grain, sunflower seeds, sugar beets, cotton, vegetables and other plant products will make it possible to ensure a systematic performance of all types of agricultural operations by machines. For example, under the conditions of the Moldavian SSR the use of industrial technology in the production of corn, sunflower seeds, sugar beets and vegetables increases the yield 30 or 50 percent, lowers the expenditures of labor per unit of output 1.5- to 2-fold, improves its quality and reduces losses. In the cotton growing of the Uzbek SSR industrial technology increases labor productivity 1.5- to 1.8-fold and lowers production costs 1.4- to 1.7-fold.

According to the calculations of the Ukrainian Scientific Research Institute of Economics and Organization of Agriculture, the introduction of a machine system for an overall mechanization of the production of agricultural products will make it possible to lower the expenditures on the performance of mechanized operations throughout the public sector of the Ukrainian SSR by an average of 13 to 15 percent by 1985. The introduction of advanced forms and methods of machine utilization will make it possible to increase the productivity of labor on the performance of technological processes and operations by 10 to 20 percent and to lower operating costs by 4 to 5 percent.

As a result of the systematic implementation of the agrarian policy of the Communist Party of the Soviet Union, in the last 15 years the number of tractors in the country's agriculture increased from 1,613,000 to 2,580,000, of trucks, from 945,000 to 1,607,000 and of grain harvesting combines, from 520,000 to 713,000 respectively. The power available to agriculture per worker increased from 7.7 hp to 24.2 hp. At the end of the five-year plan the total capacity of the tractor pool exceeded 191 million hp.

The list of equipment supplied to agriculture was also expanded. In 1965 the industry manufactured 380 types of machines and implements for rural areas and at present their list reaches 1,500,000, which exceeds the 1965 level almost fourfold. During the 10th Five-Year Plan more than 42 billion rubles were allocated for the retooling of agriculture, while the total capital investments of the state and kolkhozes in the development of agriculture were 170 billion rubles.

The indicated measures made it possible to greatly raise the level of mechanization of agricultural production. The technological processes of basic soil cultivation, sowing of grain crops, cotton and sugar beets and harvesting of grain and silage crops have already been mechanized fully. An overall mechanization of the application of mineral fertilizers, vegetable sowing, potato planting, hay mowing, interrow cultivation of row crops, harvesting of corn for grain and so forth is being completed.

However, the level of mechanization of a number of key agricultural operations is still insufficient. For example, according to the data of 1980, cow milking is mechanized 90 percent, water supply at large-horned cattle sections and complexes, 89 percent, at hog breeding complexes, 94 percent and at poultry breeding complexes, 95 percent, fodder distribution, 45, 66 and 85 percent respectively and manure removal, 75, 86 and 86 percent. Overall mechanization has been carried out only at 42 percent of the large-horned cattle sections and complexes, at 63 percent of the hog breeding complexes and at 72 percent of the poultry breeding complexes.

The data presented show the great potentials in the replacement of heavy manual labor with mechanized labor, in the disengagement of acutely scarce manpower and in the solution of serious social problems connected with bringing the nature of labor in rural and urban areas closer together.

A total of 1.87 million tractors with a total engine capacity of 152 million hp and 600,000 grain harvesting combines will be delivered to rural areas during the 11th Five-Year Plan. The output of equipment worth more than 17 billion rubles was envisaged for plant growing and worth 14 billion rubles, for animal husbandry and fodder production. The industry mastered the production of the K-701, T-150, MTZ-80 and MTZ-82 powerful high-speed tractors. The calculations performed by the workers of the Tselinograd Scientific Research Institute of Mechanization of Agriculture have shown that, when these tractors are used, the labor intensiveness of work is lowered sharply and the need for machine operators is reduced considerably. However, all this will be realistic provided tractors are supplied with the necessary set of agricultural machines (plows, seeders, harrows, spreaders and so forth).

A dynamic development of agriculture requires the implementation of a number of organizational and economic measures for an improvement in the quality of agricultural equipment. The rapid rates of scientific and technical progress and the complexity and multiplane nature of the problems solved in its course require scientifically substantiated planned management taking future possibilities and needs into consideration.

At the present stage responsible tasks are set for workers in agricultural machine building. The July (1978) Plenum of the CPSU Central Committee considered it necessary to complete during the 11th Five-Year Plan the overall mechanization of cultivation of all major agricultural crops and to maximally raise the level of mechanization in animal husbandry. In connection with this a vast program for the production of machines for plant growing, animal husbandry and feed preparation was adopted. It will be necessary to meet the needs of agriculture for highly productive tractors with a full set of mounted and trailed implements and other modern machines, as well as to greatly expand the output of new equipment to ensure a dynamic development of agriculture.

Overall mechanization--the main factor in the growth of labor productivity and release of workers from agriculture--will make it possible to provide manpower for other national economic sectors in a planned manner and, as a result, to create additional national income with a simultaneous increase in the production of agricultural products.

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