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5 March 1981

... FBIS 40TH YEAR 1941-81 ...

USSR Report

AGRICULTURE

(FOUO 1/81)



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POST HARVEST CROP PROCESSING

UDC 658.58.011.46:665.347.8.002.3

PROGRESS, PROBLEMS IN PROCESSING OF 1980 SUNFLOWER CROP REVIEWED

Moscow MASLO-ZHIROVAYA PROMYSHLENNOST' in Russian No 10, Oct 80 pp 4-6

[Article by V.M. Korostelev, deputy chief of Upraszchirmaslo of the USSR Ministry of the Food Industry and chief of the Production-Economic Department: "Efficient Processing of the 1980 Sunflower Crop"]

[Text] At the present time, the sunflower seed from the new crop is being processed at oil and fat enterprises representing an overall capability of more than 21,500 tons daily.

The majority of the enterprises coped with their capital repair work during the approved periods and made fine preparations for receiving and processing the seed of the new crop. But, at the same time, some enterprises, for various reasons, were slow to commence operations again following the completion of capital repair work.

Thus the Rostov Oil and Fat Combine, owing to the fact that its boiler room was not ready, was delayed by almost 10 days in starting up its operations once again following capital repair work. There were also incidents of capital repair work schedules being extended at oil and fat enterprises of the MPP [Ministry of the Food Industry] of the Ukrainian SSR and other republics.

During the period of capital repair work, 10 million rubles worth of imported and 3 million rubles worth of domestic technological equipment were installed at the enterprises. This included 45 husking drums, 54 aspiration seed machines, 70 roller machines of the VS-5 type, 40 screw conveyer presses, 3 distillation units, 12 toasters and other items of extraction equipment.

During the period of mass sunflower seed harvesting operations, which lasts for 10-15 days, the oil and fat enterprises must ensure continuous acceptance of the seed directly from kolkhozes and sovkhoses located within the 50 kilometer raw material zone. This amounts to 70,000 tons of seed daily. In addition and in accordance with agreed upon schedules, sunflower seed is supplied by grain receiving enterprises of the USSR Ministry of Procurement.

For the timely acceptance and processing of oil-bearing raw materials from the 1980 crop, the following equipment was prepared and placed in operation: dryers representing an overall capability of 56,000 tons daily, elevators and mechanized storehouses having an overall capacity of approximately 1 million tons of sunflower seed.

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This year the capabilities of the dryers are being increased by 6,000 tons daily, including 3,500 tons daily through the placing in operation of 11 new dryers and 2,500 tons daily as a result of the modernization of existing dryers.

At enterprises of RSFSR MPP, the plans call for the modernization of 31 dryers through the installation of attachments to the drum dryers (20 units) and conversion over to the use of gas (11 units).

At the same time, the ministries of the food industry for the Georgian SSR and the Kazakh SSR are not devoting proper attention to increasing the capabilities of the dryers and, as a result, the Ochamchira and Ust'-Kamenogorsk oil extraction plants still do not have dryers.

The capabilities of the dryers at the Pologi Oil Extraction Plant and the Prikolotnoye Oil Plant are not being employed in a satisfactory manner.

It bears mentioning that the RSFSR MPP is not placing sufficient emphasis on the construction of elevators and storehouses for the storage of oil-bearing seed. Thus, for the construction of a 14,000 ton elevator at the Millerovo Oil Extraction Plant, at an estimated cost of 2.84 million rubles (including 2.2 million rubles for construction-installation work), only 1.13 million rubles (including 0.99 million rubles for construction-installation work) were utilized during the 1977-1979 period and during the first 6 months of 1980, against a plan calling for 0.52 million rubles worth of construction-installation work, only 13,000 rubles worth of such work, or 2.5 percent, was carried out.

A 10,000 ton mechanized storehouse has been under construction for more than 4 years at the Belorechensk Oil Extraction Plant. However, the placing in operation of this project was not planned for 1980 and, as a result, the castor oil plants are being stored under unsatisfactory conditions.

Organizational-technical measures are being implemented this year at enterprises of the RSFSR MPP in the interest of increasing the capabilities by 340 tons daily, including 100 at the Armavir Combine, 150 at the Krasnodar Combine, 50 at the Labinsk Plant and 40 tons daily at the Kropotkin Plant.

At enterprises of the MPP for the Ukrainian SSR, as a result of modernization and the implementation of organizational-technical measures, the capabilities are being increased by 250 tons daily, including 30 at the Vinnitsa Oil and Fat Combine, 40 at the Odessa Combine, 20 at the Dnepropetrovsk Combine, 20 at the Slavyansk Combine, 20 at the Zaporozh'ye Combine and 40 tons daily at the Chernovtsy Combine.

During the 4th quarter, the oil and fat enterprises must ensure unconditional fulfillment of the production plan for vegetable oil and, in addition to achieving observance of the approved norms for oil and solvent losses, they must also lower such losses. Everything is still not going well in this important work.

Whereas enterprises of the RSFSR MPP, during the processing of their sunflower seed, lowered somewhat their oil losses compared to 1979, the oil and fat enterprises of the MPP for the Ukrainian SSR exceeded their normative oil losses by 1,219 tons during the first 6 months. The above-normative oil losses were especially high at

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the Slavyansk (224 tons), Odessa (205 tons), Chernovtsy (312 tons) and Kirovograd (148 tons) oil and fat combines and at the Svatovo Oil Extraction Plant (176 tons).

This testifies to the fact that the Ukrzaszhirmasloprom is not providing sufficient direction for the work being performed by the oil and fat enterprises. The oil extraction and pressing plants must carry out their work in a rhythmic and stable manner and utilize their capabilities fully. Taking into account the shortcomings noted in 1979 and during 9 months of 1980, special attention should be given to utilizing fully the capabilities of the Pologskiy Oil Extraction Plant and the two MEZ-350 extraction lines placed in operation at the Kirovograd Oil and Fat Combine.

The leaders of associations must ensure the timely shipping of the vegetable oil and oil-seed meal and the continuous supplying of the enterprises with raw materials, fuel and extraction benzine.

Greater control should be exercised over observance of the technological regimes for production, especially the production of goods which conform to the standards. There have been cases of sunflower oil-seed meal being produced which did not meet the standard for protein content and this is completely unacceptable. Each such incident must be investigated immediately and measures developed for ensuring the production of only standard products.

In the processing of sunflower seed, the national economy realizes the greatest results when complex use is made of all of the products of such processing. Special importance is attached to ensuring that the oil and fat enterprises carry out their tasks concerned with supplying cake and oil-seed meal for the mixed feed industry, sunflower hulls for enterprises of the Main Administration of the Microbiological Industry of the USSR Council of Ministers and phosphatide concentrates for enterprises of the USSR Ministry of the Meat and Dairy Industry, for the production of substitute whole milk, and for enterprises of the confectionary industry.

The country's kolkhozes and sovkhozes engaged in the production of agricultural crops and also the enterprises which process the agricultural raw materials launched an extensive socialist competition aimed at making worthy preparations for the 26th CPSU Congress. The socialist obligations undertaken by workers attached to oil and fat enterprises include measures directed towards ensuring the timely transporting, cleaning, drying, storing and processing of sunflower seed and with reduced losses and high quality products being obtained.

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LIVESTOCK

PROJECTED ACCOMPLISHMENTS IN POULTRY INDUSTRY OUTLINED

Moscow PRITSEVODSTVO in Russian No 1, Jan 81 pp 2-4

[Article by V. Lisin: "Toward New Goals"]

[Text] The year 1980 has ended. The 10th Five-Year Plan has been completed. Its final results are being reviewed. The Soviet people have a right to be proud of the results of their labor in all the spheres of the economy, science and culture. In his speech at the October (1980) Plenum of the CPSU Central Committee Comrade L. I. Brezhnev on behalf of the participants in the plenum expressed gratitude and sincere thanks to all advanced collectives and to all urban and rural workers, who did so much for the flourishing of our country.

In order to improve the well-being of the Soviet people, from the national income during the 10th Five-Year Plan 329 billion rubles more were spent than during the previous five-year plan. Payments and benefits from public funds increased by 134 billion rubles. This capital was used for free education, medical services, workers' rest and financial security in old age. A total of 717 billion rubles' more worth of industrial products and 50 billion rubles' more worth of agricultural products were produced than during the past five-year plan. Our country's economic and defense potential increased significantly during those years.

A big forward step was taken in the development of agriculture. The average annual grain output exceeded 200 million tons for the first time during the 10th Five-Year Plan. Kazakhstan's grain growers made an important contribution to the solution of this problem. For 4 years the republic sold more than 1 billion poods of grain to the state. Grain growers in Krasnodarskiy Kray and in Orenburgskaya, Kustanayskaya and a number of other oblasts worked with inspiration. Cotton sowing republics made new advances. All of them fulfilled the cotton picking assignments of the five-year plan.

Animal husbandry workers also worked well. The population of all types of livestock and poultry increased. Output rose.

Firmly following the policy of the March (1965) Plenum of the CPSU Central Committee, our party did tremendous work and laid down the foundations for modern agriculture, which we can and must have in order to fully meet the people's needs for food and the industry's needs for raw materials.

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However, as a result of the rise in the people's well-being and purchasing power, the demand for livestock products, especially for meat and milk, is increasing rapidly. For a number of reasons during the 10th Five-Year Plan it was not possible to achieve what was envisaged in the plans. This was connected primarily with the fact that only 1976 and 1978 were comparatively favorable in terms of weather conditions. The remaining 3 years were extremely difficult for agriculture in many regions. This was reflected in the provision of farms with fodder and hampered meat and milk production. In such a complex situation livestock breeders and all rural workers had to make heroic efforts to increase, not only to preserve, the population of livestock and poultry and to avoid a slump in the development of animal husbandry branches.

The decisions of the July (1978) and October (1980) plenums of the CPSU Central Committee and the draft of the CPSU Central Committee for the 26th Congress of the Communist Party of the Soviet Union "Main Trends in the Economic and Social Development of the USSR for 1981-1985 and for the Period Until 1990" published for a nationwide discussion envisage a set of measures for the further development of agriculture, increase in its material and technical equipment, strengthening of kolkhoz and sovkhoz economy and a stable growth of output.

The CPSU Central Committee considered it necessary to develop a special food program. This program will cover and draw together problems connected with an increase in agricultural output, measures for its better preservation, as well as processing and transportation to the consumer, and problems concerning the development of the food industry and other industrial branches servicing agriculture. This agrarian and industrial food complex will be planned, financed and managed as a single whole to ensure great final results.

The draft "Main Trends in the Economic and Social Development of the USSR for 1981-1985 and for the Period Until 1990" during the 5-year period envisages an increase of 12 to 14 percent in the average annual agricultural output and a rise of 22 to 24 percent in labor productivity on public farms.

The problem of an accelerated development of animal husbandry and the maximum possible increase in the production of meat, milk, eggs and other products is of fundamental importance in the improvement of food supply for the population. By 1985 the production of meat should be increased to 17 or 17.5 million tons (in carcass weight), of milk, to 97 or 99 million tons and of eggs, to no less than 72 billion.

Measures to strengthen the material and technical equipment of fodder production and to establish a reliable fodder base for animal husbandry have been envisaged. An increase in the production and improvement in the quality of fodder is considered one of the urgent tasks of the appropriate branches of the agrarian and industrial complex. Special attention is given to the solution of the problem of fodder protein, primarily through an expansion of sown areas and a considerable increase in the production of pulse crops, that is, peas, lucerne, clover, lupin, rape, soybeans and others, as well as an accelerated development of the production of fodder yeast.

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A further growth in the production of livestock products will be attained through a rise in productivity with a simultaneous increase in the population of livestock and poultry.

Breeding work on improving the pedigree and productive qualities of animals and on developing highly productive, new breeds, lines and hybrids of livestock and poultry suitable for raising under conditions of large mechanized farms and sections will have to be improved considerably.

Veterinary services and the supply of various veterinary preparations, tools and equipment for farms are improving.

In machine building for animal husbandry and fodder production it will be necessary to ensure the manufacture of highly efficient sets of machinery and equipment for advanced industrial processes of preparing and storing fodder and of keeping and raising livestock and poultry, to complete the development of production capacities for the output of self-propelled fodder harvesting machines and facilities for the transportation of green mass and to master the output of silage and haylage loaders.

In chemical machine building the output of flow lines for the production of protein and vitamin concentrates, fodder yeast, furfural and lysine will be increased and the output of complete flow lines for the production of fodder vitamins of group B and xylite will be mastered.

Measures for an accelerated development of the production of products of microbiological synthesis, increase in the production of commodity fodder protein and lysine, a significant increase in the production of antibiotics for fodder and veterinary purposes, fodder vitamins, microbiological plant protection agents, enzyme preparations, premixes, bacterial fertilizers and other products are envisaged in the microbiological industry.

An increase of 13 to 15 percent in the production of mixed feed at state enterprises and a twofold increase in the production of protein and vitamin additives are contemplated.

More complex, new tasks have been set for poultry breeding workers during the 11th Five-Year Plan. This branch now rests on a firm industrial basis and has great opportunities for a further increase in the production of such highly valuable food products as eggs and poultry meat. The farms of the USSR Administration of the Poultry Breeding Industry have begun to have a higher share in the volumes of production and, especially, procurement of these products.

The party and the government allocated vast capital investments for the development of industrial poultry breeding. During the past 5-year period 3.5 billion rubles were spent on the construction and reconstruction of poultry breeding farms forming part of the system of the USSR Administration of the Poultry Breeding Industry. However, this sum by no means reflects all the expenditures. Considerable capital investments were needed for the manufacture of cages and other industrial equipment for the production capacities of poultry and other specialized farms being built, expanded and reconstructed, as well as for a significant expansion of the output of mixed feed and high-protein and vitamin additives,

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purchases of poultry abroad and so forth. In the end during those years the value of fixed productive capital of the farms belonging to the system of the USSR Administration of the Poultry Breeding Industry increased from 5.8 to 10 billion rubles, or 1.8-fold. Of course, this determined the positive shifts in the development of poultry breeding, to which the following indicators attest (table 1).

Indicators	Years						1980 in percent of 1975
	1975	1976	1977	1978	1979	1980*	
Egg production on all categories of farms (billion)	57.5	56.2	61.2	64.6	65.8	68.0	118
including on farms of the USSR Administration of the Poultry Breeding Industry (billion)	25.5	28.3	32.5	34.9	37.0	39.4	155
Poultry meat production on all categories of farms (thousand tons)	1938	1777	2135	2399	2573	2686	133
including on farms of the USSR Administration of the Poultry Breeding Industry (thousand tons)	676	751	929	1097	1219	1385	2.1-fold
including broiler meat (thousand tons)	173	221	297	382	458	555	3.2-fold

*Preliminary data.

During the past five-year plan the production of eggs increased by 18 percent and of poultry meat, by 33 percent. The farms of the system of the USSR Administration of the Poultry Breeding Industry, on which during that time the production of eggs increased more than 1.5-fold and of poultry meat, 2.1-fold, the production of broiler meat increasing 3.2-fold, played the main role.

With regard to the production of eggs and poultry meat on other categories of farms, that is, on kolkhozes and nonspecialized sovkhoses, as well as on the population's private subsidiary farms, it not only did not increase, but even decreased. Of course, such a situation cannot be considered normal.

The party urges that everywhere constant attention be given to the development of animal husbandry on private farms. At this stage this is a vital need. We must not fail to take into account that, having lost their former significance in state purchases, the population's private subsidiary farms continue to have a big share in the total volume of production of livestock products. For example, they annually produce 20 to 22 billion eggs, or one-third of the volume obtained on all categories of farms.

With the substantial growth of egg and poultry meat production on specialized farms their extremely uneven development in some oblasts, krays and republics is noteworthy. Five-year plans for the production of poultry products were not fulfilled in the Uzbek SSR, the Georgian SSR, the Azerbaijan SSR and the Armenian SSR, as well as in a number of oblasts, krays and autonomous republics of the Russian Federation.

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There were serious shortcomings in the fulfillment of the program for the development of poultry breeding for meat. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures To Increase Poultry Meat Production" envisaged increasing by 1980 the production of poultry meat on kolkhozes, at interfarm enterprises, on sovkhoses and on other state farms to 2,000,000 tons (in live weight), including broiler meat production to 894,000 tons. Of this amount the farms of the USSR Administration of the Poultry Breeding Industry were supposed to produce 1,546,000 tons of poultry meat, including 793,000 tons of broiler meat.

According to preliminary data, the assignments for the volumes of poultry meat production were underfulfilled. The unsatisfactory quality of mixed feed had a negative effect on the course of fulfillment of these assignments. In the last 3 years the provision of farms of meat specialization with balanced fodder comprised only 70 to 80 percent and mixed feed with a low content of protein and metabolized energy was delivered to them. Owing to the shortage of crude protein, as well as vitamin additives, the enterprises of the USSR Ministry of Procurement were forced to produce mixed feed for poultry with considerable deviations from the All-Union State Standard and great assortment violations. As a result of the use of unbalanced mixed feed in poultry breeding for meat there was a considerable overexpenditure of mixed feed per unit of output and the efficiency of this branch, especially of broiler production, was lowered.

The lag in the commissioning of pedigree farms and reproducers hampered the development of poultry breeding for meat. As a result, a number of broiler factories were short of hybrid young stock.

The construction of 289 poultry enterprises, including 199 poultry farms, with the commissioning of capacities for 348 million head of meat poultry, 30 pedigree farms for 658,000 pedigree chickens and 60 reproducers for 3,356,000 head of pedigree poultry was envisaged in 1976-1980. In fact, however, 18 pedigree poultry breeding farms were built and capacities for 1,258,000 places for poultry were commissioned. Thus, the assignment for the commissioning of production capacities on pedigree farms was underfulfilled considerably.

Whereas in the Belorussian SSR, the Kazakh SSR, the Lithuanian SSR, the Latvian SSR, the Tajik SSR and the Estonian SSR meat production was doubled or increased 2.5-fold and the assignments set were fulfilled successfully, in the Uzbek SSR, the Georgian SSR, the Turkmen SSR and some other republics, krais and oblasts these indicators did not change significantly.

The decree of the CPSU Central Committee and the USSR Council of Ministers envisaged increasing poultry meat production to 3,000,000 tons for 1985 and this means that during the new five-year plan it will be necessary to increase its production volumes in the public sector by 1,330,000 tons, or 1.8-fold. This is not an easy task.

The main and most complex problem of the further development of poultry breeding for meat lies in providing this branch with the necessary amount of nutritively balanced mixed feed. The shortage of crude protein, primarily of animal origin, as well as of synthetic amino acids, is felt most acutely. There is a shortage of a number of vitamins, trace elements and other biologically active substances vitally necessary for poultry.

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Many industrial enterprises for the production of protein and vitamin additives, whose construction was envisaged by the decrees of the CPSU Central Committee and the USSR Council of Ministers approved by the July (1978) Plenum of the CPSU Central Committee, will be put into operation only during the 11th Five-Year Plan and will be able to increase output considerably only at the end of it. Therefore, it is necessary to better utilize all the internal resources for an increase in the production of crude protein. As the experience of a number of oblasts shows, it is possible to make up for its shortage through the utilization of animal husbandry waste. There are many resources at the poultry breeding enterprises themselves. How much protein meal can be made from slaughter house waste if every factory fully eviscerates carcasses!

In order to change over to a full evisceration of poultry carcasses on all poultry breeding farms and at poultry processing enterprises of the system of the USSR Ministry of Meat and Dairy Industry, by the end of the 11th Five-Year Plan the annual production of slaughter lines must be increased to 300, that is, the machine building capacity of enterprises manufacturing this equipment must be tripled. A considerable expansion of production capacities will also be needed at enterprises manufacturing horizontal vacuum boilers.

With a general changeover to a full evisceration of carcasses and the maximum use of waste obtained after slaughtering and during poultry raising and egg incubation the resources of raw materials for the production of highly valuable protein feed at the enterprises of the USSR Administration of the Poultry Breeding Industry can be increased to 660,000 tons by 1985, that is, tripled. The production of meat and bone meal from these raw materials will increase from 54,000 to 165,000 tons. A corresponding increase in the production of protein feed can also be attained at the enterprises of the USSR Ministry of Meat and Dairy Industry.

The production of four-line hybrids for general use on commodity farms is a pivotal task in the organization of efficient broiler production. However, in connection with the acute shortage of reproducer farms many industrial enterprises fatten expensive line poultry for meat, which, as compared with hybrid poultry, gives lower increases in the live mass and consumes more feed per unit of output. That is why the manifestation of local interests should not be tolerated in the construction of reproducer farms. In every rayon, oblast and kray, regardless of the service zone for which reproducers are designed, their commissioning on the scheduled dates should be considered a foremost matter.

Special control must be established over the maximum use of the available capacities for an increase in the production of poultry meat primarily on the farms of the system of the USSR Administration of the Poultry Breeding Industry. The state invested vast funds in the strengthening of the material and technical base of these farms. Therefore, the facts of an unsatisfactory use of their production capacities are totally intolerable. There are many such facts. At the Vel'yaminov Broiler Factory in Bryanskaya Oblast, Inzhavino Factory in Tambovskaya Oblast and Kazan' Factory in the Tatarskaya ASSR only 60 to 70 percent of the production capacities have been used in the last few years. Capacities in the Transcaucasian republics are being utilized in a very unsatisfactory manner.

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Poultry meat production must be increased not only through broilers, but also through the mass breeding of young stock of ducks, turkeys and geese for meat. Unfortunately, turkeys are bred on a small scale only in seven Union republics. At the same time, in the Russian Federation, the Ukraine and Uzbekistan the stock of this valuable poultry, negligible anyway, was reduced.

The situation with the raising of geese is not better. There are goose breeding farms only in the Ukraine, Belorussia, Estonia and some oblasts of the Russian Federation.

Industrial poultry breeding is based on the use of state mixed feed, whose deliveries and expenditure increase year after year. With the very limited resources of grain allocated for feed purposes the state is doing everything to meet primarily the needs of poultry breeding for mixed feed to a maximum degree. Often this is done even to the detriment of some other branches of animal husbandry.

Under these conditions the responsibility of managers, specialists and workers on poultry breeding farms for the most efficient utilization of every kilogram of concentrates and for the maximum possible reduction of feed expenditure per unit of output should be increased. More output with the same feed--this is today's most important problem.

In the system of the USSR Administration of the Poultry Breeding Industry only 22 farms use less than 200 feed units per 1,000 eggs. At most enterprises, however, this expenditure totals from 200 to 300 feed units and in many cases much more. The time has come to analyze the matter in each specific case. The insufficient responsibility of farm managers and specialists for the part of work entrusted to them is one of the main reasons for such a situation.

The July (1978) Plenum of the CPSU Central Committee noted that, basically, the problem of egg supply for the population was solved and that an increase in poultry meat production was the main task of the workers of this branch. However, this does not mean at all that a reduction in the rates of development of poultry breeding of egg specialization can now be allowed. Conversely, the tasks are becoming more complicated. First, along with ensuring the outlined rates of increase in egg production, it is necessary to attain structural shifts so that in the next few years it would be possible to almost give up interoblast and inter-republic transportation of this product. Second, the problem of a qualitative, new transformation of farms of egg specialization has already arisen.

Experience has shown that with modern industrial technology a high level of poultry productivity and an economic efficiency of this branch can be attained at all enterprises irrespective of the climatic zone in which they are. Therefore, today we cannot reconcile ourselves to the fact that in a number of oblasts, krays and republics the indicators of chicken's egg production are still extremely low and the expenditures of feed, labor and funds in connection with this are excessively high.

The egg production of poultry in the Uzbek SSR, the Georgian SSR, the Turkmen SSR and a number of oblasts, krays and autonomous republics of the Russian Federation is two-thirds and sometimes even one-half of the production, for example, in the

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Baltic republics, Belorussia, Kazakhstan and Arkhangel'skaya, Vologodskaya, Leningradskaya, Vladimirskaya, Ivanovskaya, Kirovskaya, Kuybyshevskaya, Orenburgskaya and Magadanskaya oblasts, where 220 to 240 eggs per laying chicken are obtained annually with expenditures of less than 2 feed units per 10.

We can no longer tolerate the fact that despite the supply of feed from state resources, the higher level of mechanization and automation of production processes as compared with other animal husbandry branches and extensive possibilities for a quick replacement of unproductive poultry a number of poultry breeding enterprises have operated unprofitably and incurred considerable losses for a long time.

We must carefully study the possibilities of the farms belonging to the system of the USSR Administration of the Poultry Breeding Industry to help the population's private subsidiary farms to increase meat production by raising broilers, ducks, geese, turkeys and other types of meat poultry. From the very beginning of the year it is necessary to maximally increase the volume of incubation of eggs of all types of meat poultry at incubator and poultry breeding stations and at incubator houses of poultry breeding farms in order not only to meet the needs of poultry farms and kolkhoz and sovkhoz sections for young stock, but also to organize its regular sale to the population.

Animal husbandry farms are now undergoing the most crucial period--wintering. In the current year its successful execution is of exceptionally great importance for the fulfillment of the plans of 1981 and of the 5-year period as a whole. The work of collectives, farm managers and specialists and agricultural bodies should be evaluated from this standpoint. All organizational and mass political work should be built in this direction.

Preparing an appropriate welcome to the 26th CPSU Congress, poultry breeding workers, like all the Soviet people, have widely spread socialist competition, are searching for and activating new resources for an increase in the production of eggs and poultry meat and are making maximum efforts to have a good start in the first year of the new five-year plan.

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AGRO-ECONOMICS AND ORGANIZATION

ESTONIAN FARM INVESTMENT, SUBSIDY POLICIES, AGRO-INDUSTRIAL ASSOCIATIONS VIEWED

Moscow VOPROSY EKONOMIKI in Russian No 11, Nov 80 pp 86-93

[Article by E. Khyayal, candidate of economic sciences and member of USSR Finance Ministry Collegium, Tallinn: "Problems of Improving Control Over Agriculture"]

[Text] The task of complex agricultural development based upon mechanization, the use of chemical processes, extensive land reclamation, raising the skills of workers and active utilization of scientific achievements was advanced as early as the March (1965) Plenum of the CC CPSU. These trends were further developed and defined more specifically in the decisions handed down during the July (1987) Plenum of the CC CPSU. Once again, emphasis was placed upon the fact that the rate of growth for the country's economic potential, the standard of living for the population, the observance of the principal national economic proportions and also the status of the branch and state material and financial resources are all dependent to a considerable degree upon the level of agricultural development and the efficiency of agricultural production. Roughly 70 percent of the material wealth consumed by the population is in one way or another associated with agricultural production.

As more economic development takes place, the interrelationships between agriculture on the one hand and industry and other branches on the other will expand and become more intense. Recently, serious attention has been focused on these interrelationships and also on the problems of interenterprise cooperation and agro-industrial integration, as the foundation for the efficient functioning of the country's entire agro-industrial complex. In the process, special importance is being attached to improving the economic mechanism for controlling agriculture and the agro-industrial complex on the whole.

Based upon fulfillment of the decisions handed down by the Communist Party, both agriculture and the entire agro-industrial complex are being developed successfully in the Estonian SSR. In 1975, the gross output of the complex increased by a factor of 2.5 compared to 1965 and in 1980 it will increase by another 27 percent and reach 2.52 billion rubles. At the present time, there are less than 100,000 individuals or 7.1 percent of the republic's population carrying out work at highly mechanized and large-scale agricultural enterprises (sovkhozes and kolkhozes). Each year the sovkhozes and kolkhozes produce and sell to the state, for every agricultural worker, an average of 11 tons of milk, 2.3 tons of meat, more than

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3,000 eggs, almost 13 tons of grain, 12 tons of potatoes and 0.6 tons of vegetables. The plans for 1980 called for the following products to be produced, per capita, in the Estonian SSR: 1 ton of grain, 1 ton of potatoes, 1 ton of milk, more than 200 kilograms of meat and roughly 400 eggs. The Tenth Five-Year Plan called for an increase in the average annual volume of agricultural output, compared to the previous five-year plan, of 17 percent, milk -- 20.1, livestock and poultry -- 30.8 and eggs -- an increase of 20.2 percent. In 1975, the profitability of commodity production at sovkhozes was 42.6 percent and at kolkhozes -- 43.5 percent. In 1978, the efficiency of agricultural production decreased as a result of poor weather conditions. In 1979, the profitability at sovkhozes fell to 21.5 percent and at kolkhozes -- to 21 percent.

Growth in logistical resources, without which intense and efficient agricultural production is impossible, is achieved by means of systematic increases in investments in the particular sphere. More than 1 billion rubles, or 30 percent more than during the Eighth Five-Year Plan, were allocated for developing the logistical base for agriculture during the Ninth Five-Year Plan in the Estonian SSR and the funds for this purpose will be increased by 10 percent during the Tenth Five-Year Plan. During 1979 and compared to the previous year, the value of the fixed production capital increased by 7 percent and the power engineering capabilities -- by 7.1 percent.

In carrying out the production program during the Tenth Five-Year Plan, the increase in logistical resources was less than that for the Ninth Five-Year Plan. Thus, special attention was devoted to strengthening cost accounting and raising the responsibility of the farms for the utilization of the material and financial resources allocated to agriculture. Further improvements are taking place in the use of material resources in agriculture with each passing year and yet we are still encountering incidents wherein the farms are acquiring technical equipment which is in short supply, without sufficient justification, and they are using such equipment in an inefficient manner. Thus, during 1979, the output for one conventional tractor on farms throughout the republic fluctuated from 551 to 1,965 hectares (average output for the republic -- 1,222 hectares).

Improvements in the intensity and efficiency of agricultural production are greatly dependent upon measures aimed at improving control over the economies of the agricultural enterprises and upon the skilful use of the economic stimuli and levers -- cost accounting, profit, prices, bonuses, credit. In the process, special importance is attached to improving the system of price formation for agricultural output and for the industrial products consumed by agriculture and also to the services provided for agriculture.

The measures undertaken for the purpose of improving and intensifying control over agricultural economics (introduction of monetary wages at kolkhozes commencing in 1960, the conversion of sovkhozes over to complete cost accounting in 1967, the introduction of new principles for issuing material incentives for agricultural labor from a single source -- material incentive fund -- commencing in 1971 and so forth) promoted an acceleration in the rates of growth for gross and commodity output and also for labor productivity in agriculture. However, during the past few years the production costs for agriculture have risen steadily and this is adversely affecting the economies of the farms. Periodic increases in the

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procurement prices (the last occurring on 1 January 1979) for individual products, with no improvements being carried out in price formation on the whole, preclude the possibility of normal conditions existing on individual farms for expanded reproduction.

Price formation must be based upon a systematic approach and promote the establishment of interrelationships and interdependencies between the procurement, wholesale and wholesale factory prices for goods and the rates for providing services for agriculture and it must correctly reflect the degree of participation of industry and other branches in raising the efficiency of agriculture and the APK [agro-industrial complex] on the whole. Under the existing system of price formation, agriculture is a low profitability branch of material production. Thus, in 1979 the profitability of agricultural enterprises with regard to production capital in the republic was 5.6 percent and with regard to production costs -- 21.5 percent; for 1978, the figures were 5.8 and 22.4 percent respectively. At the same time, the profitability of enterprises of the Ministry of the Meat and Dairy Industry and Goskomsel'khoztekhnika, with regard to the value of the fixed production capital, amounted to 40 and 12.8 percent respectively.

The great majority of kolkhozes and sovkhoses (50-65 percent) operate under worse production conditions owing to insufficient savings and they utilize their production potential to only a minor degree. At the beginning of 1979, the republic's agricultural enterprises had a monetary surplus amounting to 63.7 million rubles and by the beginning of 1980 this surplus had decreased to 51.5 million rubles and was to be found mainly on the accounts of highly profitable farms. At the same time, surplus indebtedness in terms of Gosbank credit for production requirements amounted to 84.6 million rubles (in 1979 -- 47 million rubles) and for capital investments -- 159.0 million rubles (in 1979 -- 160 million rubles), that is, the indebtedness to Gosbank compared to the previous year had increased on the average by 18 percent and at economically weak farms -- by a factor of 1.5-3. Thus, the proportion of credit is gradually increasing in the production turnover of agricultural enterprises. We are of the opinion that in order to strengthen cost accounting in capital investments for expanding production, the proportion of internal financing sources must be increased. However, during the Tenth Five-Year Plan, this proportion of investments fell to 74 percent compared to 81 percent during the Ninth Five-Year Plan.

Budgetary appropriations for agriculture, for measures carried out by non-agricultural enterprises (land reclamation, zoological and veterinary services and so forth) are increasing at a rapid rate. During the 1965-1977 period, investments for this purpose increased on the whole throughout the country by a factor of 3.8 (more than 10 percent of the overall total of financial resources used in agriculture). In the Estonian SSR, budgetary financing for land reclamation work alone amounted to more than 450 million rubles during the 1966-1975 period and during 4 years of the Tenth Five-Year Plan almost 250 million rubles have already been expended for this purpose. As a result, the proportion of reclaimed land from areas processed throughout the republic exceeded 50 percent and this, coupled with improvements in the agricultural practices, is providing comparatively high yields for the agricultural crops (the highest grain crop yield -- 31 quintals per hectare -- was achieved in 1976; in 1979, it amounted to 24.6 quintals per hectare). However, the lands reclaimed at state expense are quite often utilized incorrectly

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and inefficiently by many farms. Thus, in order to raise the responsibility of the agricultural enterprises, their participation is required in the financing of the land reclamation work.

In the interest of creating favorable conditions for agricultural development, the state uses budgetary funds for covering a portion of the expenses of sovkhozes and kolkhozes for acquiring industrially produced products. Machines, tractors, metal, fuel, mineral fertilizers, equipment and other production resources are sold to the agricultural enterprises at favorable prices. With further expansion and intensification of agricultural production, the budgetary expenditures for these purposes increase and this weakens the effectiveness of cost accounting stimuli both in agriculture and in industry. We are of the opinion that in the future a gradual conversion must be carried out from direct budgetary financing over to more complete self-support by the agricultural enterprises, with the appropriate expenditures being included in the procurement price.

In addition, the budget participates actively in the formation of the final product of the APK. Large sums in the form of the difference in prices for milk, meat and other agricultural products are paid out of the budget to the industrial enterprises which process the agricultural products and to the trade organizations. In the case of constant retail prices, a subsidy is employed here for consumption and not for production.

In recent years, the state budgetary outlays for directly financing the development of production at agricultural enterprises throughout the republic have remained at the level of 30 million rubles annually. The existing system for financing capital investments is fraught with a number of shortcomings, which preclude the possibility of making complete use of the stimulating effect of the financing-credit mechanism for raising the effectiveness of these investments. For example, in organizing the financing of state agricultural enterprises, clear and economically sound limitations between the individual sources for financing expanded reproduction are lacking. Thus the capital investment sources are determined not by the financial potential of the enterprises, but rather by deciding whether or not the objects of the investments are to be financed by means of the budget. For the construction of livestock husbandry complexes, dwellings and cultural-domestic installations, the budgetary appropriations are made available for the most part regardless of whether or not the farms have their own resources for the stated purposes or the amounts of such resources. This lowers the stimulating value of profit in the development of production, since the obtaining of budgetary funds is not associated with the internal financial resources of enterprises and is not dependent upon the results of their economic activity. Under difficult conditions, budgetary funds can be presented not only to low-profit but also to high-income farms.

At the present time, budgetary and credit financing of the planned volumes of capital investments, in the presence of a deficit of internal funds for the stated purposes, is not associated with the actual profitability of the enterprises. This leads to a situation wherein the centralized and irreversible budgetary funds for capital investments are often allocated to profitable enterprises and credits -- to low-profit or unprofitable enterprises. Measures undertaken to improve the economies of agricultural enterprises have still not brought about an equalization

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of the conditions for reproduction among them. In a computation for 100 hectares of agricultural land, economically strong farms employ capital investments in considerably greater amounts than enterprises having insufficient fixed capital and included on the list of low-profit enterprises. Thus, whereas at the end of 1979 the republic's agricultural enterprises possessed on the average 21,700 rubles worth of fixed capital per 100 hectares of cultivated land, the economically strong farms (poultry and hog raising farms) -- 60,000 rubles worth, and economically backward farms (mainly livestock raising and vegetable raising farms) -- from 11,300 to 14,000 rubles worth of fixed capital. At the same time, the differences between the agricultural enterprises in the level of development of the logistical base are not only continuing, but in fact they are gradually becoming greater.

At the present time, the coefficient of variation in the equipping of the republic's farms with fixed production capital amounts to more than 40 percent, labor resources -- 44, profit per hectare of cultivated land -- 82 percent and so forth. In 1979, 10 percent of the sovkhoses operated at a loss or had zero results, 70 percent had profitabilities of less than 25 percent and only 20 percent of the sovkhoses had profitabilities which exceeded 25 percent. Moreover, during the Ninth Five-Year Plan the coefficients of variation increased by 8 percent for equipment availability, 5 percent for the availability of labor resources and 14 percent for profit. At the present time, differences are being observed in the conditions of management for the sovkhoses and kolkhozes. For example, the profit norm per hectare of cultivated land at sovkhoses fluctuates from 13 to 1,045 rubles and at kolkhozes -- from 43 to 506 rubles.

In order to prevent greater differentiation in the economic status of enterprises and in the interest of smoothing out the conditions for agricultural production, we are of the opinion that a conversion should ideally be made over to the normative methods for planning capital investments, methods which call for a definite level of equipment availability with the aid of the budget and beyond the budget -- using internal resources and bank credit. The normative indicator should be introduced into the long-range plans for farm development and the volumes of capital investments should be distributed among the farms in conformity with it.

At the present time, owing to irregularities in the system of intra-branch redistribution, a considerable portion of the financial resources of high-profit farms (several tens of millions of rubles) is not being utilized. These funds are the resources of Gosbank for issuing credit for the national economy.

Experience has shown that the more complicated the conditions of management, the stronger the effect on these conditions of unfavorable weather factors. However, in the case of an excessive dispersion of capital investments, their effectiveness decreases even at economically strong farms. We are of the opinion that it is most advisable to carry out investments at economically backward farms, since more unused reserves are available here for raising production efficiency.

Since the procurement prices are oriented towards average-zonal production conditions and ensure normal cost accounting stimuli for 20-30 percent of the farms in the Estonian SSR, then the majority of those kolkhozes and sovkhoses which operate under objectively worse conditions are employing their production potential in a weak manner, owing to an insufficiency of internal resources and stimuli and

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limited budgetary financing. This leads to a slow-down in the rates of development for the branch and insufficient support for the population in terms of food products and for industry -- in raw materials. The procurement prices must ensure normal cost accounting stimuli for a majority of the farms and those economically strong enterprises which operate under objectively better conditions must, on a normative basis, contribute a portion of their additional profits to the budget in the form of payments. A source for covering the production costs of those farms operating under worse conditions could be the net income created at all technological stages in the production and processing of agricultural products (in 1977, the total amount of net income from the production and processing of agricultural products amounted to 61.1 billion rubles, including profit -- 20.9 billion rubles and turnover tax -- 40.2 billion rubles).

An important reserve for accelerating the rates of growth for agricultural efficiency is that of improving the structure of investments in the key branches of the agro-industrial complex. The development of those branches of industry which supply agriculture with mechanization equipment should ideally be accelerated, since agriculture throughout the republic is still not being supplied adequately with the machines and mechanisms required for the complex mechanization of all production processes and this is forcing the enterprises into producing the required machines and units themselves using primitive methods.

Under the conditions imposed by agro-industrial integration, great importance is attached to achieving a combination of branch and territorial principles for organizing and controlling the economic system. During the 25th CPSU Congress, L.I. Brezhnev noted that in addition to complex mechanization, the use of chemical processes and land reclamation, the principal tasks associated with agricultural development include further specialization and concentration of production based upon intensified interenterprise cooperation. The harmonious development of the agro-industrial complex is dependent to a considerable degree upon these tasks being solved.

Those enterprises created on the basis of specialization, concentration and agro-industrial integration are producing high production results. Thus, at an experimental hog raising combine of the model-demonstration Sovkhoz Technical School imeni Yu. Gagarin (a completed production cycle and a capability for 5,400 tons of pork annually), where the production processes are fully mechanized, the direct labor expenditures per quintal of weight increase in the hogs during 1979 amounted to 4.2 man-hours, whereas the average indicator for the republic, for the same period of time, was greater by a factor of 2.1. Or, for example, the direct labor expenditures for the production of 1 quintal of milk in 1979 at a completely mechanized dairy farm (for 1,100 cows) of the Laatre Sovkhoz in Valgaskiy Rayon amounted to 2.2 man-hours (less by a factor of two than the average for kolchozes and sovkhoses throughout the republic). The profitability for milk production at the large "Laatre" farm was 55 percent. This exceeded the average profitability for farms throughout the republic by a factor of more than two. In addition, the development of industrial methods ensures a stable production rhythm.

The extensive development of cooperation is opening up new opportunities for the concentration of resources and production and for raising the level of its collectivization. In the production associations formed on a cooperative basis,

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the prerequisites are being created for the industrial reorganization of all agricultural branches and, even more important, it will be possible here to take into account the urgent requirements of the economic mechanism, to overcome the limitations placed upon the isolated cost accounting of kolkhozes and sovkhoses and to weaken the conflict between the centralization and decentralization of economic interests.

An administrative rayon is a basic and common production, social and administrative complex in which the agricultural and service enterprises and party and soviet organs of control function in close contact with one another as they solve common tasks: produce the final products with minimal expenditures, ensure balanced economic and social development for the given territory. The rayon agricultural administrations coordinate to a definite degree the work being carried out on their territories by agricultural enterprises, but not those enterprises which provide services for agriculture or process its output. Many isolated agricultural enterprises and especially enterprises which provide services for agriculture are subordinate to other enterprises. The rayon agricultural administrations do not have their own resources for exerting an economic influence on the reproduction processes and they bear no economic responsibility for their own actions; the material interest of their workers in the final results of their activity is considerably less than that of farm workers. Thus, their potential for exercising scientific and planned control over the production, social and economic processes is limited.

The existing system of cost accounting in the primary echelon of control is concerned only with the expanded reproduction of individual sovkhoses and kolkhozes and does not call for the maintenance of proportionality or balance in the production, economic and social growth factors for a rayon or the republic as a whole. The development of production forces and technical-social contacts is stimulated more completely and purposefully only if the efforts and resources of individual farms are combined through the use of cost accounting for territorial-branch formations. In the RAPO's [rayon agro-industrial association] created in the Vil'yandinskiy and Pyarnuskiy rayons of Estonia, these functions are being carried out successfully by centralized funds, which simultaneously serve as economic levers for influencing reproduction and social development. The differentiation in the contributions being made by the farms to the centralized funds, based upon taking into account the conditions of management, signifies to a definite degree a leveling off of these conditions. The centralization of financial resources for carrying out production specialization and concentration and for improving the cultural-domestic conditions of association workers is also important from the standpoint of drawing the two forms of ownership closer together.

Experience in the operation of the Vil'yandinskiy Rayon agro-industrial association reveals that this form of control over agriculture is effective. It promotes agricultural development at an accelerated tempo, it ensures production concentration and specialization and modernization of the logistical base and it promotes the rapid introduction of modern scientific achievements and leading experience and further development of the territorial and branch principle of control. Under the conditions found in our republic, a state-cooperative, agro-industrial production association ensures a constant intensification of production, the efficient use of state resources and successful solutions for the problems of social development in the rural areas.

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During the 1976-1979 period, the average annual production of grain in Vil'yandinskiy Rayon was 14,000 tons, potatoes -- 21,300 tons, milk -- 95,100 tons, meat -- 21,700 tons and eggs -- 10.5 million. Compared to the average annual production figures for the Ninth Five-Year Plan, the figure for milk was higher by 29 percent and that for meat -- higher by 39 percent. There are 11,500 individuals engaged in agricultural production and 95,000 hectares of land are being cultivated. The indicators for the effectiveness of Vil'yandinskiy Rayon in terms of agriculture surpass the average indicators for the republic as a whole. The Pyarnuskiy Rayon agro-industrial association, organized in 1979, has also displayed advantages in the carrying out of the principal types of agricultural work (sowing, harvesting, feed procurement and so forth). In 1980 and compared to 1979, milk production increased by more than 10 percent, meat -- by 10 percent; these figures were higher than the average rates of growth for the republic.

Compared to a rayon agricultural administration, a RAPO has great opportunities at its disposal for utilizing economic levers for developing production in the rayons. Four centralized funds provide the material base for this: production development fund, fund for social-cultural measures and housing construction, material incentives fund and mutual assistance fund. All of the kolkhozes and enterprises subordinate to an association participate in the creation of the funds and the norms for contributions to the funds are differentiated based upon objective conditions of management. The volume of the funds, the basis for their creation and also an estimate of their use are approved by the associations council. In 1979, the centralized funds amounted to 5 percent of the farm profits. In the future, the centralization of funds will increase to 10-15 percent of the profits of all farms in the rayon. This ensures the financing of all common undertakings. At the same time, sufficient funds will remain at the disposal of the farms for developing production using their own resources. The plans call for all rayons throughout the republic to convert over to this form of economic control.

The territorial-branch principle of agricultural control, based upon cost accounting at the rayon level, must be organically combined with the branch and inter-branch principles of control and at the republic level. Thus, we are of the opinion that in the future and throughout the republic, in addition to rayon interenterprise cost accounting associations, work will also be performed by ministries, committees and associations organized according to the branch principle (for example, Goskomsel'khoztekhnika, Estpishcheprom, Estkolkhozstroy and so forth).

In the future, as the logistical foundation for improving economic relationships throughout the republic is created, the formation of a republic agro-industrial association will become possible. It could include agricultural type ministries, industrial branches associated with the production of goods for agriculture, branches which process agricultural output and procurement, trade-marketing, supply, motor transport and other organizations which provide services for agriculture. The ministries and departments may fully retain their function as state branch organs of control and at the same time remain directly subordinate to the organ that controls the republic agro-industrial association.

In view of the fact that great differences exist in the profitabilities of individual farms -- owing to the fact that the results of their activities are influenced by objective factors -- the payments into the budget by highly profitable

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sovkhozes and kolkhozes which operate under the best management conditions should ideally be increased, while farms which operate under the worst of conditions -- have profitabilities lower than the optimum level, that is, less than 30 percent of the production costs and 12 percent of the production funds -- should be released entirely from having to make payments into the budget.

The existing economic mechanism engenders unjustified differences between the sovkhozes and kolkhozes in connection with the sources for establishing the funds for expanded reproduction, in the distribution of income, in the principles for establishing production costs and the wage fund, in the forms for making payments into the budget and in social security and insurance for kolkhoz members. These differences confront the sovkhozes and kolkhozes with unequal socio-economic conditions and this limits the opportunities for the planned utilization of material and labor resources in agriculture. We are of the opinion that a gradual conversion should ideally be carried out over to a single economic mechanism for controlling the kolkhozes and sovkhozes.

We believe that the system now in use at kolkhozes for making payments into the budget should be standardized and placed in use at sovkhozes. In the interest of bringing the profit and net income distribution system at kolkhozes and sovkhozes closer together, a system of issuing bonuses to all workers from a single source -- material incentives fund -- should be introduced, with money being added to this fund depending upon the increase in gross output volume compared to the level achieved during the preceeding 3 years and upon the total amount of savings realized in production expenditures, computed per ruble of gross output.

In order to place the farms and associations under equal conditions with regard to the logistical support for production programs, the state plans should ideally be developed based upon normatives, limits, indicators and norms for material and labor expenditures, as approved by USSR Gosplan. Moreover, one group of indicators established on a centralized basis defines what the farms and associations must place at the disposal of the national economy (grain, meat, milk, vegetables and so forth) and the other group -- what the state must place at the disposal of the farm or association (credit, volume of fixed capital, raw materials limits and so forth).

The realization of a complex of measures aimed at improving control over agriculture will ensure improvements in our Soviet economy and it will make it possible to achieve new successes in communist construction. During the 25th party congress, L.I. Brezhnev emphasized that "The Central Committee opposes rash and hasty reorganizations of administrative structures or of existing methods of management. Look before you leap, as the saying goes, and try something out eight or even ten times before finally putting it to use. But if you have already tried it out and if you are aware that the constantly developing national economy is restricted within the framework of the existing economic mechanism, then the latter must be improved in a decisive manner.

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STATUS, PROSPECTS FOR DEVELOPMENT OF SUNFLOWER VARIETIES

Moscow MASLO-ZHIROVAYA PROMYSHLENNOST' in Russian No 10, Oct 80 pp 6-10

[Article by M.F. Bozhko, candidate of Agricultural Sciences at Khar'kov Branch of VNIIZh and N.S. Yakimenko, candidate of Agricultural Sciences with the State Committee for the Strain Testing of Agricultural Crops of the USSR Ministry of Agriculture: "Status and Prospects for Strain Changing of Sunflowers"]

[Text] The principal oil-producing crop in our country is that of sunflowers, the result of improved economic effectiveness in the cultivation of this crop. This became possible owing to the fact that such eminent Soviet plant breeders as V.S. Pustovoyt, L.A. Zhdanov, V.I. Shcherbina, G.T. Romanyuk, N.I. Prokhorov, V.K. Morozov and others were the first throughout the world to create and introduce into production operations selected varieties of sunflowers characterized by high yields and high oil content.

The plant breeders successfully employed an effective selection method developed for sunflowers by Academician V.S. Pustovoyt: mass individual selection, with an evaluation of succeeding plants and specialized open pollination of the best types and seed.

For the very first time in world practice, a system was organized in the USSR for improved seed production and annual strain renovation for sunflowers, the plan for which was also developed by V.S. Pustovoyt.

The introduction into production operations on a mass scale of new and highly productive selected varieties of sunflowers and improved seed production operations with annual strain renovation and improvements in the culture of farming generally and in the sunflower cultivation technology in particular have made it possible to raise by several times the cropping power of sunflowers and the oil yields being obtained.

Thus the cropping power and gross oil percentage for processed sunflower seed, taking into account the actual moisture content and degree of contamination for the

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USSR on the whole, amounted in 1940 to 7.4 quintals per hectare and 28.6 percent respectively, in 1950 -- 5.0 and 30.4 and in 1956 -- 8.7 quintals per hectare and 34.9 percent. Hence, in 1940 201 kilograms of oil were obtained per hectare, in 1950 -- 152 and in 1956 -- 272 kilograms. In 1968 and 1973 the cropping power for sunflowers, for the country as a whole, reached 13.7 and 15.5 quintals per hectare respectively and the gross oil content of the seed -- 45.95 and 45.24 percent. Thus, 629 kilograms of oil were obtained from each hectare in 1968 and for 1973 -- 701 kilograms.

At state strain testing stations throughout the country, where the testing of agricultural crop varieties is carried out, the cropping power and oil content of sunflowers were considerably higher than at kolkhozes and sovkhoses: during the 1966-1970 period -- by 7.2 quintals per hectare and during 1971-1975 -- by 5.5 quintals per hectare, or by 54.5 and 41.6 percent respectively.

Throughout the last five-year period, the oil percentage of marketable sunflower seed, in a conversion for absolutely dry and clean raw material, remained at the 50.6-51.6 percent level, whereas it was 53-56 percent at individual strain testing stations.

An analysis of sunflower strain changing data, according to the principal natural-climatic zones in which this crop is grown and covering the past 80 years, reveals the following.

In 1913, sunflowers were grown in Russia on an area of 982,000 hectares. At this time, selected varieties were used for replacing popular varieties. Based upon local peasant sunflower varieties, selected varieties were created which were resistant to the sunflower moth and the common strain of broom rape A: Zelenka, Khar'kovskaya 76, Kubanskiy Kruglik 7-15-163 and Saratovskiy 169.

During the initial years following the revolution, such selected varieties of sunflowers as Fuksinka, Voronezhskaya and Kruglik A-41 were created. These varieties were employed extensively at the time. However, in the late 1920's, all of the selected varieties of sunflowers under cultivation began to be infected in large quantities by a new strain of broom rape -- B.

Towards the end of the 1920's and in the early 1930's, new selected varieties of sunflowers were created which were resistant to a complex of strains of broom rape A and B: Zhdanovskiy 6432 and Zhdanovskiy 8281, Fuksinka 61 and Fuksinka 62 (Veydelevskiy 61 and 62), Armavirskiy 762, Armavirskiy 768, Kruglik 1975 and Kruglik 1846. The productivity of these varieties was comparatively low: the cropping power at state strain testing stations was 10-17 quintals per hectare and the oil percentage of the seed -- 28-35 percent. The huskness percentage of the seed was 40-53 percent.

Moth and broom rape resistant varieties of sunflowers were regionalized during the 1930's and 1940's: in the central-chernozem oblasts -- Fuksinka 62, Zhdanovskiy 8281, Chernyanka 11; in the Volga region -- Saratovskiy 169, Zhdanovskiy 6432, Zhdanovskiy 8281; in the north Caucasus -- Zhdanovskiy 8281, VNIIMK [All-Union Scientific Research Institute of Oil-Bearing Crops] 1646; in the forest-steppe zone of the Ukraine -- Zelenka 76 and Khar'kovskiy 2281; in the steppe zone of the

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Ukraine and in Moldavia -- Zhdanovskiy 8281, Zhdanovskiy 6432, Saratovskiy 169; in the southern Urals, western Siberia and Kazakhstan -- Saratovskiy 169. Depending upon the zone in which these varieties were grown, the cropping power ranged from 10-27 quintals per hectare, the fat content in the seed was 26-41 percent and the percent of huskness of the seed -- 30-43 percent.

During the 1950's and 1960's, broom rape resistant and highly productive varieties were created and introduced into production operations on an extensive scale: Peredovik, Armavirskiy 3497, VNIIMK 6540, VNIIMK 8883, VNIIMK 8931, Mayak, Zelenka 368 and Smena. Moreover, Peredovik, Armavirskiy 3497 and VNIIMK 6540 were regionalized in a number of oblasts in the central Chernozem, Volga and north Caucasus economic regions of the RSFSR and in the Ukrainian SSR, the Kazakh SSR and the Moldavian SSR.

At state strain testing stations, the cropping power of these varieties was 15-30 quintals per hectare, the oil percentage -- 40-50 percent and the huskness percentage of the seed -- 21-26 percent.

During the late 1950's and early 1960's, the majority of the selected varieties created during the 1930's and 1940's were removed from regionalization and replaced by new and highly productive varieties considered to be more broom rape resistant. In addition to such widely used mid-season ripening varieties as Peredovik, VNIIMK 6540, Armavirskiy 3497, Zelenka 368, Mayak and Smena, a number of early and rapid-ripening varieties were introduced into regionalization. In the northern regions of the central Chernozem oblasts, for example, the early and rapid-ripening varieties Voronezhskiy 109, Voronezhskiy 151, Voronezhskiy 154 and Chernyanka 66 were regionalized; in the Volga region -- Yugo-vostochnyy and VNIIMK 8883; in the southern Urals -- Yugo-vostochnyy and Armavirets; in western Siberia -- VNIIMK 8883 and Yenisey; in Kazakhstan -- VNIIMK 8883, Chernyanka 66, Armavirets, Kustanayskiy 91.

The productivity of sunflowers, similar to any other agricultural crop, is dependent upon the length of the growing season. Sunflower varieties having longer growing seasons usually have greater cropping power and oil percentage. However, our Soviet plant breeders have succeeded in overcoming this barrier to a certain degree. Early and rapid ripening varieties have been created which have comparatively short growing seasons and which, in terms of cropping power and the oil percentage of the seed, are almost equal to the mid-season ripening varieties.

The systematic use of the new and more effective method for improved seed production and strain renovation work has made it possible to improve, in a more purposeful manner, the pedigree qualities of the seed during the course of seed production work. This made it possible, during the 1950's and 1960's, to improve those varieties employed more extensively in regionalization. The oil percentage of regionalized varieties increased especially rapidly. In 1971, the principal sunflower varieties -- Armavirskiy 3497, VNIIMK 1646, VNIIMK 6540, VNIIMK 8883, VNIIMK 8931, Zelenka 368, Peredovik and Smena -- were recognized as having been improved (to the level of new varieties). In many regions in which they were grown, the oil percentage of these varieties reached 51-53 percent.

New and highly productive varieties were regionalized during the Ninth Five-Year Plan: mid-season ripening Khar'kovskiy 100 and Armavirskiy 14, early ripening Voskhod, Zarya and Zenit and the rapid ripening Salyut variety.

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The following varieties were regionalized during the tenth five-year period: the new early ripening varieties Voronezhskiy 272 and Khar'kovskiy 50; the mid-season ripening and highly broom rape resistant varieties Progress, Odesskiy 63 and Start; the first high-oleic sunflower variety in the history of plant breeding Pervenets and the first strain-linear hybrid in domestic plant breeding -- Rassvet.

The state testing of sunflower varieties is being carried out at 156 state strain testing stations in the principal zones of industrial cultivation of this crop. More than 70 varieties and hybrids of both domestic and foreign breeding are undergoing testing.

In recent years, 30 varieties of sunflowers have been regionalized. The extent of high quality plantings of sunflowers in 1978 is revealed in the following table (thousands of hectares).

Variety	USSR	RSFSR	Ukrainian SSR	Kazakh SSR	Georgian SSR	Moldavian SSR
Total amount of high quality plantings	4209681	2413592	1551674	93376	13745	137294
Peredovik improved	1073504	960194	82196	8452	-	22662
Armavirskiy 3497 improved	838486	24976	800631	-	12879	-
VNIIMK 8883 improved	586002	586002	-	-	-	-
VNIIMK 6540 improved	510454	7796	502658	-	-	-
Zenit	159384	159384	-	-	-	-
VNIIMK 1646 improved	151734	1854	37376	-	866	111638
Smena improved	140919	140919	-	-	-	-
Yenisey	94778	94778	-	-	-	-
Salyut	94649	74774	-	19875	-	-
Armavirets	71610	-	-	4455	-	-
Mayak improved	69562	26532	43030	-	-	-
Chakinskiy 269	69323	69323	-	-	-	-
Voskhod	59190	8144	10908	40138	-	-
Yugo-vostochnyy	56410	56410	-	-	-	-
Zelenka 368 improved	43872	24704	19168	-	-	-
Voronezhskiy 154	41574	41574	-	-	-	-
Armavirskiy 14	40651	862	39789	-	-	-
VNIIMK 8931 improved	40310	40310	-	-	-	-
Zarya	20456	-	-	20456	-	-
Odesskiy 63	14635	-	11641	-	-	2994
Progres	8109	8109	-	-	-	-
Luch	7467	7467	-	-	-	-
Sputnik	6545	6545	-	-	-	-
Voronezhskiy 272	4126	4126	-	-	-	-
Khar'kovskiy 100	3924	-	3924	-	-	-
Pervenets	1174	1174	-	-	-	-
Volgar'	480	480	-	-	-	-
Khar'kovskiy 50	353	-	353	-	-	-

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The results of a study carried out during the 1976-1979 period on the economic-biological and physical-chemical properties of regionalized, new and more promising varieties of sunflowers, by economic regions, krays and oblasts, reveals the following.

At state strain testing stations throughout the country and depending upon the natural-climatic zone in which grown and the strain peculiarities of the sunflower varieties tested, the cropping power was 15-43 quintals per hectare, the oil percentage of the seed -- 47-58 percent and the yield of oil -- 700-1700 kilograms per hectare.

For example, at state strain testing stations in Belgorodskaya Oblast the average cropping power for the Zelenka 368 improved variety during the 1976-1978 period was 29.1 quintals per hectare, the oil percentage of the seed -- 51.6 percent and the yield of oil -- 1322 kilograms per hectare; the growing season was 134 days in duration.

In Volgogradskaya Oblast, the Peredovik improved variety furnishes on the average a seed yield of 20.3 quintals per hectare and an oil yield of 897 kilograms per hectare, with the growing season being 136 days in length; the oil percentage of the seed was 50.2 percent.

In the Kalmyk ASSR, the average cropping power for the Pervenets variety during 1977-1978 was 31.8 quintals per hectare, the oil percentage of the seed -- 51.2 percent and the oil yield -- 1434 kilograms per hectare; the growing season was 122 days in length.

At state strain testing stations in Krasnodarskiy Kray, the average cropping power for the VNIIMK 8931 improved variety during the 1976-1978 period was 35.9 quintals per hectare and the oil yield -- 1578 kilograms per hectare.

During this same period, at state strain testing stations in Altayskiy Kray, the Salyut variety produced an average of 19.4 quintals per hectare; the oil percentage of the seed was 50.8 percent and the oil yield -- 860 kilograms per hectare; the growing season was 106 days in length.

In Cherkasskaya Oblast, according to the results of tests carried out over a period of 2 years (1977-1978), the Rassvet hybrid furnished a seed yield of 30.3 quintals per hectare, with an oil percentage of 50.5 percent; the oil yield was 1347 kilograms per hectare and the growing season -- 115 days.

In Dnepropetrovskaya Oblast, during tests carried out on the Trudovik variety in 1978, a yield of 29.9 quintals per hectare was obtained; the oil yield was 1500 kilograms per hectare, with a seed oil percentage of 55.5 percent.

During the 1977-1978 period, at state strain testing stations in Vostochno-Kazakhstanskaya Oblast, the cropping power of the Zarya variety was 28.4 quintals per hectare, the seed oil percentage -- 52 percent, the oil yield -- 1320 kilograms per hectare and the growing season -- 113 days.

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At the Krasnolimanskiy State Strain Testing Station in Donetskaya Oblast, during tests carried out on the Khar'kovskiy 101 variety during the 1974-1978 period, a seed yield of 26.9 quintals per hectare was obtained, with the average oil percentage of the seed being 57 percent.

At the Rostov State Strain Testing Station, the oil yield for the Armavirskiy 3497 improved variety was 1705 kilograms per hectare and for Peredovik improved -- 1708 kilograms per hectare.

In 1977, at the Vysokopol'ye State Strain Testing Station in Khersonskaya Oblast, the oil yield for the VNIIMK 6540 variety was 1784 kilograms per hectare, Pervenets -- 1685, Progress -- 1682 and for the Rassvet hybrid -- 1566 kilograms per hectare.

As a result of the breeding and seed production work carried out with sunflowers, great changes took place in the physical-chemical and technological properties of the seed and in its various morphological parts. Over a period of 50 years, the oil percentage of the seed increased by twofold and the huskness of the seed decreased by a factor of 2.5. The amount of cellulose in a husk decreased by a factor of almost 1.5; its lipid content (botanical oil percentage) increased from 0.5 to 3.5 percent and its content of nitrogen-containing substances in a conversion for protein -- from 3 to 7 percent.

The physical-chemical properties of the seed of selected varieties of sunflowers fluctuate within broad limits depending upon the growing conditions. On the average, the seed of modern selected varieties of sunflowers is characterized by the following parameters: mass of 1000 units of absolutely dry seed -- 50-70 grams, volumetric mass -- 360-440 grams per liter, specific mass -- 0.650-0.750 grams per cubic centimeter, huskness of seed -- 18-24 percent.

The oil of modern sunflower varieties, with the exception of the Pervenets variety, consists of 65-73 percent linoleic, 16-26 percent oleic, 4-5 percent stearin and 5-7 percent palmitin fatty acids. The oil of the Pervenets variety contains 60-70 percent oleic acid and 20-30 percent linoleic acid.

In recent years, all of the selected varieties of sunflowers have been subjected to infection by sclerotinosis (storage rot), grey mold and false mildew. Thus, in 1976, 1977 and 1978, in almost all zones in which sunflowers are grown, the plantings were partially destroyed by these diseases. At the present time, there are some varieties and especially new hybrids which are partially immune (tolerant) to these dangerous diseases, for example the Progress variety and the Rassvet hybrid and also the rapid ripening Salyut, Armavirets and other varieties.

The following sunflower varieties and hybrids are planned for high quality regionalization during the Eleventh Five-Year Plan.

In oblasts of the Central-Chernozem region, the varieties Voskhod, Voronezhskiy 154 and 272, Zelenka 368 improved, Peredovik improved, Salyut and Chakinskiy 269 remain in regionalization (in Lipetskaya Oblast, the Chakinskiy 269 variety is removed from regionalization). The plans call for the following new early ripening varieties to be included in regionalization: Trudovik in 1981 and Voronezhskiy 436 in 1982.

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In the oblasts and autonomous republics of the Volga region, the varieties VNIIMK 8883 improved, Volgar', Yenisey, Zenit, Peredovik improved and Salyut remain in regionalization (in Penzenskaya Oblast, the Volgar' variety is removed from regionalization, in the Kalmyk ASSR -- the VNIIMK 8931 improved and Smena improved varieties). The Pervenets variety is being included in regionalization in the Kalmyk ASSR. In 1982, the plans call for the Rannespelyy 38 variety to be included in regionalization and in 1984 -- a new hybrid which will have a growing season of approximately 80 days and produce oil at the rate of 1000 kilograms per hectare.

In the Severo-Kavkazskiy Rayon, the Armavirskiy 3497 improved, VNIIMK 8883 improved, Peredovik improved and Salyut varieties remain in regionalization (Armavirskiy 14, VNIIMK 1646 improved, VNIIMK 6540 improved, VNIIMK 8931 improved, Luch, Mayak improved, Smena improved and Sputnik are removed from regionalization and in Rostovskaya Oblast -- Armavirskiy 3497 improved). The areas to be used for the new regionalized varieties Zenit, Progress and Pervenets are being expanded considerably. In 1981, the new varieties Trudovik and Start will be included in regionalization and in 1983 the plans call for the regionalization of a new hybrid having a growing season of 90-100 days; it will furnish a seed yield of 34-38 quintals per hectare and have an oil percentage of 53-54 percent and an oil yield of 1500-1650 kilograms per hectare.

The Armavirets and Yugo-vostochnyy varieties remain in regionalization in Orenburgskaya Oblast and the plans call for the regionalization of Rannespelyy 38 in 1982.

In Altayskiy Kray, the Yenisey and Salyut varieties remain in regionalization.

In the Ukrainian SSR (in Vinnitskaya and Cherkasskaya oblasts), Peredovik improved remains in regionalization and the Rassvet hybrid is being included in regionalization.

In Donetsk-Pridneprovskiy Rayon, the varieties Armavirskiy 3497 improved, VNIIMK 6540 improved and Voskhod remain in regionalization (VNIIMK 1646 improved, Zelenka 368 improved and Khar'kovskiy 100 are being removed from regionalization in the northern oblasts. Khar'kovskiy 50, Khar'kovskiy 101, Trudovik and the Rassvet hybrid are being introduced into high quality regionalization. Pervenets is being regionalized in Sumskaya Oblast.

VNIIMK 6540 remains in regionalization in the southern region (Armavirskiy 3497 improved, Armavirskiy 14 and Peredovik improved are being removed from regionalization and in 1984 -- Mayak improved). The plans call for regionalization of the Odesskiy 63, Start, Rassvet and Trudovik varieties.

In Vostochno-Kazakhstanskaya Oblast in the Kazakh SSR, the Armavirets, Zarya and Coskhod varieties remain in regionalization, in Pavlogradskaya Oblast -- Salyut and in Semipalatinskaya Oblast -- Voskhod. In 1984, the plans call for the regionalization of a new and rapid ripening variety or hybrid, which will furnish an oil yield of 950 kilograms per hectare.

Odesskiy 63 and Rassvet are being regionalized in the Moldavian SSR (in 1982, VNIIMK 6540 improved will be removed from regionalization and in 1985 -- Peredovik improved).

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