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LIVESTOCK

MODERNIZATION IN KAZAKH LIVESTOCK SECTOR DISCUSSED

Moscow IZVESTIYA in Russian 13 Oct 82 p 1

/Article by I. Stetsenko, head of the department of economics of the Tselinograd Engineering-Construction Institute, candidate of economic sciences, Tselinograd: "Second Life of the Farm"/

/Text/ Kazakhstan's livestock breeders are called upon to play a prominent role in the realization of the food program approved at the May (1982) Plenum of the CPSU Central Committee.

Virgin land represents not only millions of hectares of plowed and developed land. Essentially, such a traditional sector of agriculture as animal husbandry has been revived here during the years of their development.

However, time goes on, nor does technical progress stand still. Stagnant technology is replaced with other technology, improved equipment appears, other requirements are placed on labor organization and the following question is quite natural: What is to be done with the farms and complexes that do not meet today's requirements? To build new ones? This is expensive. Moreover, a great deal of time will be needed. The way out suggests itself: It is necessary to modernize and reconstruct barns, to renovate equipment and to improve technology.

The scientists of our institute developed such a plan for the transfer of animal husbandry to advanced technology for one of the rayons of Tselinograd Oblast. In a year the results of its introduction had a pronounced effect on the activity of farms. The savings of capital investments alone on six farms, where reconstruction was carried out, totaled 500,000 rubles. The significant gain was reflected in the time of performance of operations. However, the main gain was in the increase in output.

On the 40 Let Kazakhstana Sovkhoz milk and meat production increased by 20 percent and all the expenditures on reconstruction were recovered during the first year. The Krasnoyarskiy Sovkhoz also attained a high yield. The average annual milk yield increased from 1,887 to 3,314 kg and gross production doubled, exceeding 4,000 tons annually. Labor expenditures on the production of 1 quintal of output were lowered from 8 to 5 man-hours.

In six oblasts of North Kazakhstan there are 2,900 farms, of which 2,335 were built during the period of development of virgin land, as well as 235 complexes and fattening areas put into service in the 1970's. The certification of farms in Tselinograd Oblast carried out by our institute has shown that one out of four farms needs to be fully reconstructed. It would seem that there can be no two opinions here: It is necessary to carry out reconstruction, which promises a high yield in the very near future. However, during the 11th Five-Year Plan 90 complexes are to be built and only six farms are to be reconstructed--less than 1 percent of the actual need!

Reconstruction is now being carried out, but everything is being done at the responsibility and risk of farm managers. All those that have run across the so-called economic method even once know to what such a practice leads.

Go-getting managers and specialists receive material and technical resources elsewhere, obtain allocations by any means and at times attain good and some even excellent results. However, where managers do not know how to find resources work drags out for years and often is performed without plans and estimates, by eye.

Conditions under which contracting organizations hardly participate in reconstruction have emerged in virgin land. They willingly undertake the construction of new farms and complexes. There are many reasons for this. First of all, the big dispersal of livestock barns over the oblast, their remoteness from construction administrations, negligible volumes of work and difficulties in the organization of material and technical supply. Finally, as a rule, the remodeling of farms and complexes is more complicated than new construction. Here there are fewer possibilities for the mechanization of work and introduction of advanced methods of labor. The dismantling of walls and partitions, installations of various openings and apertures and flooring are carried out manually.

That is why construction organizations by hook or by crook try to avoid such work. Only a change in existing rules and estimates would make it possible to carry out the technical retooling of farms in much bigger volumes than is being done now. Even the repair and construction organizations established especially for such purposes at oblast agricultural administrations are only partially occupied with this work very beneficial for farms. For example, in Tselinograd Oblast in such a construction administration the proportion of reconstruction in the total volume of performed operations is less than one-half. The fulfillment of the production program is ensured mainly through new construction. The chase after advantageous projects leads to the fact that rural areas have remained without reliable contractors.

I would like to discuss another problem. The transfer of animal husbandry to modern production technology also requires a serious scientific substantiation. The zonal Tselingiprosel'khoz Institute developed a program envisaging how many and what farms will be remodeled and what increase in capacities and in output this will ensure. However, this is only part of large-scale work. The sector's intensification dictates a broader approach to the problem. It is necessary to draw up zonal, oblast, rayon and intrafarm plans for a gradual transfer of animal husbandry to a modern industrial basis, which would contain substantiated proposals for the reconstruction of every farm.

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ORGANIZATION OF BELORUSSIAN LIVESTOCK BREEDING OPERATIONS

Moscow ZHIVOTNOVODSTVO in Russian No 11, Nov 82 pp 13-15

[Article by L.Ya. Legkiy, director of the Belorussian Breeding Association of the BSSR Ministry of Agriculture: "Organization of Breeding Work in the Republic"]

[Text] Animal husbandry is a leading branch of agricultural production in the republic. It accounts for one half of the gross and three fourths of the marketable agricultural output. Thus, by way of attaching special importance to pedigree animal husbandry as one of the principal factors for bringing about quality changes in the herd, a number of decrees were adopted in the republic during the 10th Five-Year Plan aimed at strengthening this branch.

These directive documents outlined a program for the selection of agricultural animals, they provided a list of approved breeding farms and the numbers of brood stock and poultry and they tasked the BSSR MSKh [Ministry of Agriculture] and other organizations with solving those problems concerned with the organizational-administrative strengthening of breeding farms, ensuring that the animals are supplied with all types of high quality feed and the production of special mixed feeds and carrying out a complex of operations associated with land reclamation and logistical supply for enterprises of the breeding service. A program for the construction of state breeding enterprises and specialized breeding sovkhozes for carrying out checks on bulls for the quality of their offspring was defined more precisely. Measures were defined for improving the selection and training of specialists engaged in the artificial insemination of animals.

The Belorussian Breeding Association has been created and is in operation. It consists of Glavplemupravleniye [Glavnoye upravleniye po plemennomu delu, iskusstvennomu osemeneniyu sel'skokhozyaystvennykh zhivotnykh i zakupkam plemennogo skota; Main Administration for Breeding Work, the Artificial Insemination of Agricultural Animals and Procurements of Pedigree Livestock] and a breeding center, which includes BelNIIZh [Belorussian Scientific Research Institute of Animal Husbandry] and a republic trust for breeding plants and oblast breeding associations consisting of oblast breeding trusts and oblast livestock breeding associations. Breeding operations at kolkhozes and sovkhozes are being carried out and controlled by rayon breeding stations which are subordinate to oblast breeding trusts. The organization of the Belorussian Breeding Association has made it possible to unite science with production for the purpose of solving the vital problems of pedigree animal husbandry and it has

imposed higher requirements on the production subunits and raised the role being played by the scientific institutes in breeding work.

A base has been created for pedigree animal husbandry consisting of 24 breeding plants, the Budagovo Experimental-Production Farm and 75 breeding sovkhozes (of which number 6 specialize in increasing the milk yields of first heifers -- the daughters of checked bulls).

All bulls of dairy and beef strains are concentrated at 11 state breeding enterprises. The average productivity of the mothers of the dairy strain bulls during lactation was 6,569 kg of milk and the fat content 4 percent and the mothers of the fathers -- 7,105 kg of milk and the fat content 4.18 percent. The construction of all of the enterprises and their public services and amenities will be completed this year.

The procurements and sale of pedigree young stock are carried out by six oblast breeding associations. Each year they sell 105,000-106,000 head of large-horned cattle, 118,000-120,000 hogs and 7,000-8,000 sheep to the republic's farms and to farms outside the republic.

An overall plan for selection-breeding work during the 1979-1990 period has been developed and approved for the republic. In conformity with this plan, plans have been developed on farms in all six oblasts. Based upon these all-round plans, work is being carried out aimed at improving the black-variegated cattle, which account for 82 percent of the republic's cattle, including up to 73 percent of its cows. Pure-bred cattle constitute 57 percent of the overall number of cattle in the Belorussian SSR on the whole. For breeding purposes, use is made of a new and highly productive plant line of bull -- Koldkhoster 90936 of the black-variegated strain -- and also 10 families having a productivity of 5,000-8,000 kg of milk and a fat content of 3.8-4.0 percent. Work is being carried out aimed at breeding six more lines and 10 families.

Scientists at BelNIIZh and the Vitebsk Veterinary Institute and breeding service specialists attached to kolkhozes and sovkhozes are continuing their work of breeding a pedigree group of beef cattle, one which will be distinguished by early maturing, effective use of pastures and coarse and succulent feeds and high dressed weights.

The partial realization of the selection programs in hog raising has made it possible to complete work on the breeding of an intra-strain type of large white and Belorussian black-variegated strain of hog. The animals of the new type are characterized by fine meat qualities and during fattening display a daily weight increase of 670 grams or more with a feed consumption of 4 feed units per kilogram of weight increase. Work is being completed on creating lines of hogs which achieve a weight of 100 kg in 175 days and two synthetic lines -- in just 170 days. By 1985, work will be completed on the creation of zonal types of hogs of the large white and Belorussian black-variegated strains.

Crosses are being created in hens which have an egg production in an initial layer of 255 eggs (by 1985 -- 260 eggs annually with an average egg weight of not less than 60 grams). Work is nearing completion on the creation of a cross of ducks

having high reproduction qualities and a lowered fat content in the carcass, animals which will attain a live weight of not less than 2.5 kg by the time they are 50 days old.

We are aware that the successful solving of the tasks confronting the breeding plants constitutes the foundation for achieving high results in carrying out the selection programs. Thus we are devoting special attention to strengthening their logistical base and to selecting highly skilled cadres of specialists. At the present time, the number of highly productive cows available for obtaining young replacement bulls at breeding plants has been raised to 2,000 head, including 680 having a productivity of 6,000 kg of milk. In 1980, more than 10,000 kg of milk were obtained from 12 cows during lactation. A cow at the Korelichi Breeding Plant, during the 3d lactation, produced 12,333 kg of milk with a fat content of 3.98 percent.

During the first 6 months of this year, improvements were realized in the use of checked bulls. In 1982, more than 40 percent of the cows will be inseminated using the semen of bulls which were checked in terms of the quality of their offspring. In a laboratory of genetic expertise, all of the young large-horned cattle stock and hogs being used for selection purposes (young replacement bulls, the daughters of checked bulls and boars undergo a check for authenticity of origin. During 1981, 15,100 blood samples were checked in the laboratory.

One hundred and twenty specialized farms have been organized for the specialized raising of replacement heifers. Here, in 1981, 52,000 non-calving young cows were raised and sold to other farms. It has been established that non-calving young cows raised at the specialized farms have a productivity that is 10-12 percent higher than that of animals raised at kolkhozes and sovkhozes. Included among the better specialized farms are the kolkhozes imeni Kirov in Vitebskiy, Rassvet in Baranovichskiy, Oktyabr' in Kamenetskiy and Krasnyy Oktyabr' in Dobrushskiy Rayons. During the last half of 1982, the Rassvet Kolkhoz raised and sold 440 non-calving young cows having a live weight of 411 kg (on the average) at 24 months of age and the Krasnyy Oktyabr' Kolkhoz -- 838 non-calving young cows having an average live weight of 401 kg at 24 months of age.

An automatic sub-system of control, based upon use of the ES-1028 electronic computer, is being introduced into operations for providing operational management for the breeding work. This sub-system is part of the all-round special purpose Zhivotnovodstvo [animal husbandry] ASU [automatic control system].

The work carried out in connection with improving breeding operations has made it possible to raise the productivity of cows at breeding plants up to an average of 3,200-3,500 kg of milk annually and the average daily weight increase in large-horned cattle to 900-1,000 grams and hogs -- to 650-700 grams, with feed consumption (during fattening) of 7 and 4.2 feed units respectively. Even higher indicators are being developed by our best breeding and commodity farms -- the kolkhozes Osnezhitskiy, Rassvet and imeni Orlovskiy, the sovkhoz-combines Mir and imeni 60-Letiya BSSR and also other farms. In 1981, at the Mir Sovkhoz-Combine, 10,064 young bulls were removed from fattenning regimes at an average live weight of 470 kg and following an average daily weight increase of 1,090 grams. Each year the Sovkhoz-Combine imeni 60-Letiya BSSR in Borisovskiy Rayon sells 12,000-

13,600 tons of pork to the state, with the average daily weight increase in the hogs during fattening being 670-674 grams here. In 1981, at the Grodno Control-Testing Station for Hog Raising, an average daily weight increase of 763-843 grams was obtained during controlled fattening from the offspring of Leopard 6501 and Snezhka 6505 boars of the Belorussian large white strain of the BKB-1 type, with a live weight of 100 kg being attained at 174-179 days.

At the same time, we are aware that the work being performed by structural subunits of the Belorussian Breeding Association is fraught with shortcomings which are restraining further improvements in the breeding and productive qualities of the animals. The potential productivity of the animals is not being realized fully and shortcomings exist in the reproduction of all types of agricultural animals.

One of the principal causes of these derelictions is the low level of feeding for the animals, especially in recent years. But we are aware that on many farms the selection potential is not being utilized owing to organizational and administrative shortcomings, a weak logistical base for the breeding plants and sovkhozes and non-fulfillment of the plans for using capital investments for construction, land reclamation and a complex of operations associated with improving the fertility of soil and creating a strong feed base for pedigree animal husbandry.

Thus, during the 1976-1980 period, the BSSR Minvodkhoz [Ministry of Water Management] and Glavpoles'yevodstroy carried out only 70 percent of the land drainage work planned at breeding farms, the irrigation of long-term cultivated pastures -- 30 percent and soil improvement work -- 50 percent, including at breeding plants -- 75, 55 and 80 percent respectively. This same situation persists at the present time. It is having an adverse effect on strengthening the feed base for the breeding farms.

Referring to a shortage of protein raw materials, the republic's Ministry of Procurements is not providing the selection herd of breeding plants with special mixed feeds in adequate quantities, nor has it commenced the production of grain mixtures from bruised grain. During 1981, of the plan for producing 8,000 tons of mixed feed for highly productive animals, only 4,200 tons were prepared (the overall requirement for such feed is approximately 20,000 tons).

In Belorussia, a great amount of attention is being given to reproduction of the herd and to organizing the artificial insemination of animals. Ninety five percent of the cows and heifers are being artificially inseminated.

There are 44 inter-farm associations for the artificial insemination of livestock operating within the republic. However, the cooperative form for organizing the insemination of livestock is not being further disseminated owing to a shortage of good quality motor transport vehicles. Thus an intra-farm circuit form for organizing artificial inseminations is being introduced into operations, a form which is already being employed on 460 farms throughout the republic, on each of which there are more than 800 cows. A great amount of work is being carried out at kolkhozes and sovkhozes in connection with preventing sterility and barrenness. Commencing in 1982, zootechnical departments with specialization in the reproduction and artificial insemination of agricultural animals were opened in the zoological-veterinary technical schools for the purpose of improving personnel training in each oblast.

In the zone covered by the circuit form for the organization of artificial inseminations, the yield of offspring was greater by 4-5 head than the average for the republic and P.A. Misnik of the Kolkhoz imeni Gorkiy in Pinskiy Rayon, N.P. Kuz'minchuk of the Zarya Kommunizma Kolkhoz in Ivanovskiy Rayon, T.I. Milevskaya of the Sovkhoz imeni Michurin in Ivatsevichskiy Rayon, S.S. Pismanik of the Sovkhoz imeni Pritytskiy in Molodechnenskiy Rayon and V.I. Kovalevskiy, Ya.L. Ryzhik and V.V. Pozdnyak of inter-farm associations for the artificial insemination of agricultural animals in Slonimskiy, Vitebskiy and Chashnikskiy Rayons obtained 98-102 calves per 100 cows from a herd of 1,600-2,100 cows and heifers in 1981.

Recently, greater attention has been given to the artificial insemination of hogs. For example, 147,000 sows were inseminated in 1981; this was 30,000 more than in 1980. The plan was fulfilled by 133.4 percent.

At the same time, the artificial insemination of sheep is very poorly organized throughout the republic. At 79 complexes and farms having 1,000 or more ewes, only 44 percent of the animals are being inseminated artificially. It bears mentioning that further development of artificial insemination for agricultural animals is being held back by insufficient support being provided by the state breeding enterprises, stations and laboratories in the form of equipment, instruments and reagents and so forth. Thus the republic's requirements for sodium citrate are being satisfied by only 70 percent, the D;yuar SDS-20 and SDS-50 vessels are of poor quality and insufficient quantities of ampoules, pipettes, sterilizers, thermostats, POS-5 instruments and others are being received and their quality is low.

Just as in the past, a satisfactory solution has yet to be found for the problem of publishing state breeding books. The manuscripts are being held up for from 2 to 7 years in the Urozhay Publishing House.

In addition, the scientists and specialists of Belplemob"yedineniye [Belorussian Breeding Association] are disturbed by a number of problems, the solving of which requires intervention on the part of the All-Union Association for Breeding Work of the USSR MSKh [Ministry of Agriculture]. This applies first of all to the problems of artificial insemination for all types of agricultural livestock.

1. A complete solution must be found for the problem of ensuring that the state breeding enterprises are supplied with the required storehouses, refrigeration equipment and instruments.

2. Promising technologies for the accumulation and utilization of the sperm of bulls must be introduced into operations on an extensive scale.

3. A solution has still not been found for the problem of marketing the sperm of bulls of specialized beef strains (the supply of sperm amounts to almost 3 million dosages).

4. An express method must be developed for determining the fat and protein content in milk and also the quality of the wool.

In conclusion, it should be mentioned that the scientists and specialists of Belplemob"yedineniye are undertaking measures aimed at solving successfully the assigned tasks. In the process, a great amount of attention is being given to improving the economic effectiveness of the work being performed by the breeding plants and sovkhozes, raising still further the genetic potential of the productivity of the agricultural livestock and to improving reproduction of the herd at kolkhozes and sovkhozes throughout the republic.

7026
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LIVESTOCK

SPECIALIZATION IN BELORUSSIAN HOG BREEDING

Minsk SEL'SKOYE KHOZYAYSTVO BELORUSSII in Russian No 9, Sep 82 p 17

/Article by I.N. Nikitchenko, doctor of agricultural sciences, professor and director of a selection center; V.V. Gorin, candidate of agricultural sciences and chief of a station for the testing of hog strains and lines for combination ability; A.D. Shelestov, candidate of biological sciences and head of a sector at the Belorussian Scientific Research Center for Animal Husbandry: "Specialized Lines"/

/Text/ The further development of hog breeding requires substantial reorganization of breeding work based upon the use of modern breeding and selection methods. The system of hog breeding in Belorussia, which is based upon obtaining maximum productivity by means of the heterosis effect, during the first stage (1973-1981) included the use of triple-strain crossings of the large white, Belorussian black-variegated and Estonian strains, the second stage (1981-1986) called for the converting over to strain-linear hybridization and the third stage (1986 and thereafter) -- to interlinear hybridization. In this regard, a collective of scientists at BelNIIZh /Belorussian Scientific Research Institute of Animal Husbandry/ commenced the creation in 1971 of highly productive specialized lines. The work was carried out at leading breeding plants throughout the republic -- Krasnaya Zvezda, Novyy Dvor and Zarech'ye and at the present time the principal herd is concentrated at a station for testing hog strains and lines for their combination ability of the institute's selection center. The station is a hog raising complex of the industrial type with a capability for handling 11,800 young pigs annually and with a complete turnover for the herd. Here an evaluation is carried out of existing strains and lines and new and specialized hog lines are created based upon the best strains and combinations.

In 1980 the station was supplied with hogs of established lines: 911 sows and 112 boars were brought in. This made it possible in a year's time to develop 70 percent of the production capabilities. Approximately 8,000 young pigs were obtained, 2,100 head of pedigree young stock were sold to specialized farms throughout the republic, 70 percent of which met the requirements for the elite class, and more than 300 tons of meat were sold to the state. The average daily weight increase for a group of young pigs 0-2 months of age was 210 grams, 2-3 months -- 450, replacement young stock -- 500, undergoing fattening -- 570 and on a controlled fattening regime -- more than 700 grams. In the process, it bears mentioning that during the construction of the station the capabilities were computed taking into account the need for ensuring that the animals were supplied

with full value mixed feed of the SK type and we are being allocated K-55 mixed feed, intended for hog fattening.

An industrial technology for the production of pork, one which calls for strict rhythmic reproduction of the animals, separate departmental organization of labor, the mechanization of labor-consuming processes, the rational utilization of feed and the enrichment of feed with protein, vitamin and mineral additives, was introduced into operations at the station. Here there are four principal subunits: a reproduction sector, the structure of which includes an artificial insemination laboratory and three buildings for the maintenance of unmated and pregnant sows, boars and replacement young stock; a reproduction sector having three buildings with 120 stall areas for farrowings and the raising of young pigs to 90 days of age; a sector for controlled fattening having 440 individual and group stall areas and a sector for the one-time handling of 1,080 head of pedigree young stock. All of the facilities are divided up into sections for a weekly cycle. For example, the movement of animals in the reproduction sector takes place in accordance with the following technological chart. Each day one section is filled with sows for 5-7 days prior to farrowing. Farrowings are carried out in one section, six are occupied by sows with offspring, three are used for the maturing of young pigs and one section undergoes sanitary processing and repair work. The preparation of the facilities for the assignment of a group of hogs is a very important link in the technological cycle for production and for protecting the animals against diseases.

Special importance is being attached to enriching the mixed feed with nutrients and controlling its quality. Each batch of feed is checked for toxicity, bacterial contamination and for its protein, carotene and mineral substance content. A small feed preparation shop has been created at the station. It is equipped with an extruder and a mixer. Here special feed mixtures are prepared for boars and young pigs that are under 2 months of age, with use being made for this purpose of grass, fish and meat-and-bone meal, dry milk, soybean oil-seed meal, thus making it possible to feed these valuable additives to the animals in a more rational manner. The extrusion of grain forage and oil-seed meal is being employed extensively. The feed mixtures for sows and replacement young stock are prepared directly in feed distributors of the RS-5 and KPSK-1000 types. During the summer, as a result of an efficiently organized green production line, all of the hogs are supplied with fodder made from pulse grasses.

A great amount of attention is being given to the maintenance of the animals. It is known that at large-scale complexes, owing to hypodynamics, the period for the use of sows and boars is being reduced considerably. At the station, all of the animals with the exception of those undergoing controlled fattening and unmated sows, exercise daily in special pasture yards. A summer camp for the one-time assignment of 240 head has been built for pregnant sows. The construction of trainers for the forced movement of sows and boars is being carried out. All of the facilities are equipped with machines for regulating the microclimate. This makes it possible to improve considerably the productivity of the livestock and to lengthen the span of their use, a fact which is of great importance to farms engaged in carrying out selection and breeding work.

The productivity indicators obtained during 1981 underscore the high genetic potential of specialized lines, created as a result of extended selection work.

At the present time, three lines of animals are concentrated at the station. The first specialized fattening line was developed based upon use of the large white strain and it is selected based upon its fattening qualities. The productivity of the animals of this line: polycarpic effect -- 11.5 head, weight of nest at 21 days -- 57.7 kg, at 2 months -- 184kg, preservation of young pigs -- 96 percent; the young stock attain a weight of 100 kg in 186 days, with the average daily weight increase being 741 grams and the feed consumption -- 3.62 feed units per kilogram of weight increase.

The fifth specialized beef type line is obtained using the large white, Estonian bacon Landras and Swedish Yorkshire strains, the productivity of which is described by the following indicators: polycarpic effect -- 11.4 head, weight of nest at 21 days -- 58 kg, at 2 months -- 184.4 kg, the preservation of the young stock -- 94 percent, the age at which a weight of 100 kilograms is achieved -- 186 days, average daily weight increase -- 718 grams, feed consumption -- 3.52 feed units.

The sixth specialized line is created using a complicated reproduction crossing of the large white and Estonian bacon Landras strains. These animals are very close to the hogs of the fifth line in terms of productivity. The polycarpic effect of the sows is 11.6 head, the weight of the nest at 21 days -- 59 kg, at 2 months -- 190 kg, preservation of young stock -- 94 percent, age at which weight of 100 kg is achieved -- 184 days, average daily weight increase -- 730 grams and feed consumption -- 3.43 feed units.

In addition to their productivity, these line animals are distinguished by a high combination capability. More than 15 different strain-line and inter-line combinations were studied. And the majority of the variants, in terms of a number of economic indicators, produce an effect of from 10 to 25 percent. A variant of strain-line hybridization obtained using the large white and Belorussian black-variegated strains and the fifth specialized line has just been introduced into operations on farms in Ostrovetskiy Rayon and at the Sovkhoz-Combine imeni 60-Letiya BSSR in Borisovskiy Rayon.

Based upon the experience accumulated during the first period of work by the station for the testing of hog strains and lines for combination capability, the conclusion can be drawn that a high genetic potential productivity in the animals bred, the introduction and strict observation of an industrial technology for pork production, the rational use of feed by enriching it with additives and strict observance of the sanitary-hygienic requirements all serve to guarantee the successful conduct of hog raising operations.

7026
CSO: 1824/116

ACCELERATING BEEF PRODUCTION IN UZBEK SSR

Tashkent SEL'SKOYE KHOZYAYSTVO UZBEKISTANA in Russian No 10, Oct 82 pp 28-29

[Article by I. Khidirov, candidate of agricultural sciences and deputy director of the Uzbek Scientific Research Institute of Animal Husbandry and K. Khabibullin, candidate of agricultural sciences and head of a laboratory for the technology of beef production and the quality of meat: "Intensification of Beef Production"]

[Text] An extensive program for the intensification of animal husbandry based upon increased production specialization and concentration and the development of inter-farm associations was adopted in the decisions handed down during the 20th Congress of the Communist Party of Uzbekistan. The priority tasks for strengthening and developing the logistical base for animal husbandry, employing new technologies and making extensive use of leading experience and scientific achievements were also defined.

The meat of large-horned cattle enjoys a raised demand among the population. In this regard, an increase in the production and improvements in the quality of beef are considered to be a most important task of the workers assigned to animal husbandry. Impressive goals have been outlined for them. By the end of the 11th Five-Year Plan, beef must constitute 70 percent of the republic's overall production of meat (in dressed weight).

Fine prerequisites are available for solving this task. For example, during the past few years alone more than 100 inter-farm enterprises for the fattening of large-horned cattle and the raising of non-calving young cows have been placed in operation. The plans call for the construction and expansion, during the 1981-1985 period, of the capabilities of animal husbandry complexes for the raising and fattening of 110,000 head of large-horned cattle and for the construction of five new complexes for the raising and fattening of 10,000 head each.

In connection with the production of beef, great importance is being attached to the methods developed at UzNIIZh [Uzbek Scientific Research Institute of Animal Husbandry] for the industrial crossing of dairy strains of cows with bulls of specialized beef strains. Young hybrid bulls of various strain combinations, by the time they reach 15 months of age, have already surpassed their maternal contemporaries in live weight by 17-33 kg.

At the present time, more than 95 percent of all of the republic's beef is being obtained from animals of dairy and dairy-meat strains. In this regard and in

addition to selections being carried out based upon dairy productivity, improvements should also be realized in the meat qualities of the cattle. At each commodity-dairy farm, 60-70 percent of the best cows should be singled out into a breeding group for the purpose of obtaining replacement young stock from them using the method of pure-bred breeding. The remaining 30-40 percent of the cows should be used for obtaining beef young stock by crossing them with bulls of specialized beef strains. Thus, in addition to raising the meat qualities of the cattle, the dairy herd will also be improved at a more rapid rate.

We have established that first generation hybrids obtained from crossing red steppe, black-variegated and the red Estonian strains and local cattle with bulls of specialized beef strains surpass their contemporaries of maternal strains in terms of live weight and dressing percentage by 10-12 percent and in calorific value of the carcass -- by 20-25 percent.

Inter-strain crossings are being carried out and producing results on farms in Dekhkanabadskiy Rayon in Kashka-Darya Oblast -- at the Kok-Bulak, imeni Usman Yusupov and 50 Let SSSR Sovkhozes and on farms in Surkhan-Darya Oblast -- at the Babatag, Derbent and other sovkhozes. Hybrid young stock are being raised and sold here in a high state of nourishment (their weight -- 420-450 kg), whereas the average delivery weight for large-horned cattle at kolkhozes and sovkhozes in these same oblasts is 370-390 kg.

This indicates that a greater expansion is required in industrial crossings and that this work should be carried out in two directions. Cows of dairy and mixed strains should be crossed in dairy herds with the sires of early maturing beef strains and the beef strains should also be crossed among themselves. This must be carried out as a planned measure within the managerial system for animal husbandry. When making plans on each farm, a determination must be made as to the number of brood stock to be used for crossing purposes. Here the work must be based upon evaluations of the animals, selecting cows and heifers for industrial crossings which do not have breeding value.

The republic's animal husbandry operations are being converted over to an industrial basis. Under such conditions it is not enought to obtain beef merely as a milk-associated product. A need exists for raising and fattening cattle for meat purposes using a special technology, both at dairy and at specialized beef farms.

In this regard, a question has arisen with regard to the more rapid development of beef cattle husbandry as an independent branch of animal husbandry.

The principal feeds for beef cattle are hay, straw, silage and pasture grasses. The large-horned cattle of beef strains and their hybrids with dairy strains are well suited for mountainous and foothills conditions and they are distinguished by simple tastes with regard to feed and resistance against diseases.

However, full use is not being made of this branch's reserves. In all, the republic has 180,000 head of beef cattle, including approximately 40,000 cows and non-calving young cows. Some farms sell cattle the average weight of which is lower than the average indicator for the republic.

At the present time, the republic's beef cattle husbandry operations are based mainly upon the breeding of local cattle hybrids and hybrids of dairy strains with bulls of pure-bred beef strains.

Numerous studies have shown that when the strains are correctly selected and the raising is carried out on an intensive basis to the age of 15-18 months, the hybrid young stock surpass their maternal strain contemporaries in terms of live weight by 6-12 percent, in carcass bulk -- by 12-15 percent and in dressing percentage -- by 1-3 percent. The feed consumption per kg of weight increase in such hybrids is 10-12 percent lower and the calorific value of the meat -- 15-20 percent higher.

Such beef strains as the Aberdeen-Angus and Charolaise hold great promise for crossings with dairy cows.

When carrying out crossings, special attention should be given to the individual qualities of the bulls. They must be checked for the quality of their offspring. Good feeding and normal maintenance conditions also promote the appearance of good possibilities for hybrid young stock. Scientific-production experiments which we conducted over a period of many years revealed that the greatest results are achieved through the intensive raising of hybrids, with their subsequent slaughtering at the age of 15-18 months at a live weight of 420-450 kg or more. Here the average feed consumption per head for 15 months was 2,600-2,700 and for 18 months -- 3,100-3,200 feed units.

For the efficient management of beef cattle husbandry, great importance is attached to the introduction of leading equipment developed by laboratory workers jointly with workers from the support base and specialists from beef farms. It encompasses an entire complex of questions: the selection of the most effective strain of cattle for the given conditions; the creation of a correct structure for the herd; the selection of the most feasible methods for breeding the cattle; the organization of a strong feed base; the use of progressive means and methods for the feeding and maintenance of the principal herd; the raising of pedigree young stock; the organization of zooveterinary services.

Today hybrids of local cattle crossed with early maturing beef strains are being bred and fattened on leading farms specializing in the production of beef. For example, on the Babatag Sovkhoz and on other farms in Surkhan-Darya Oblast there are already more than 5,000 hybrids. During the next few years their number will increase sharply and amount to 12-15 percent of the republic's overall number of large-horned cattle. The plans call for the average annual weight of one head to be raised to 420-450 kg.

Other elements of the technology that has been developed are also being introduced into operations. At the Babatag and Derbent Sovkhozes in Surkhan-Darya Oblast, at the Kok-Bulak and imeni Usman Yuspov Sovkhozes and at other farms in Kashka Darya Oblast, seasonal calvings of cows are being carried out from 15 March to 10 May. In the process the calves are well fed on grazing fodder prior to the pasture period and they attain roughly the same weight by the time they are ready for use.

Following the dying out of the pastures and the weaning of the young stock on farms specializing in beef production, the young stock are transferred to fattening sites

for maturing and fattening. Here the technology is such that they are able to increase in weight during the fattening period at the rate of 885-953 grams daily. The weight of 1st, 2d and 3d generation hybrids obtained from crossing local cattle with Aberdeen Angus strain reaches 400-460 kg. Ninety six percent of the animals are in a high state of nourishment.

The accelerated development of beef cattle husbandry and the extensive introduction of industrial crossings can and must become an important trend in the work concerned with carrying out the special food program outlined for the 11th Five-Year Plan.

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INTENSIFYING LIVESTOCK REPRODUCTION, SAFEGUARDING OFFSPRING

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/Article by V.S. Shipilov, Department of Obstetrics, Zoological Hygiene and Veterinary Science: "Intensification of Reproduction of Agricultural Animals and Improving the Safeguarding of Offspring"/

/Text/ The food program of the USSR is imposing responsible tasks upon animal husbandry. For example, the 11th Five-Year Plan calls for the average annual production of meat (in dressed weight) to be increased to 17-17.5 million tons and during the 12th Five-Year Plan -- to 20-20.5 million tons, milk -- to 97-99 and 104-106 million tons respectively and eggs -- to 72 and 78-79 billion units. This is an extremely difficult and yet realistic task! Even at the present time, on hundreds and hundreds of farms, the average productivity for the cows is considerably higher than the figure called for in 1990 in regions of developed dairy cattle husbandry -- 4,000 kg of milk per cow.

A distinctive feature of the food program is its systematic nature and completeness. It not only points out the totality of indicators and their levels but also the specific measures and means for achieving these indicators. In particular, in solving the tasks of animal husbandry a considerable role must be played by measures concerned with the reproduction of livestock and improving the safeguarding of young stock.

How is it possible to discuss the profitability of dairy cattle husbandry at kolkhozes and sovkhozes which annually obtain 30-40 or more fewer calves from every 100 cows and for years the replacement heifers have not been producing offspring, not to mention milk? Nor are such cases rare. For example, in 1981, on a number of farms in the central-chernozem region of the RSFSR, 38 percent of the heifers more than 2 years of age remained unimpregnated and in Belgorod, Kursk and Tambov Oblasts there are farms where the figure for such heifers ranged from 48-51 percent. Even at farms specializing in the raising of non-calving young cows, the schedules for the insemination and impregnation of replacement heifers are being dragged out to an excessive degree.

Statistics indicate that the economic harm caused by sterility exceeds the losses inflicted upon animal husbandry by all of the infectious and non-infectious diseases taken together.

In a number of oblasts, a reduced amount of attention is being given to organizing the reproduction of sheep and pigs. In 1981, some farms in Kaluga, Bryansk and Gorkiy Oblasts obtained 38-50 lambs from every 100 ewes and only 10-12 young pigs per sow. And this extremely abnormal phenomenon, which is being repeated from year to year, is not being evaluated properly. "The impression is such" stated L.I. Brezhnev during a meeting in the Central Committee of the Communist Party of Kazakhstan, "that some workers have become accustomed to low livestock productivity and to abnormalities in reproduction of the herd. Let us recall the past -- for a peasant, failure to obtain a calf from a cow was a great misfortune and terrible blow. We can no longer leave this work in this condition"*.

Sterility and low fertility are extremely widespread in other countries also. Thus it was by no means an accident that this most important problem was the subject of nine international congresses and a number of symposiums, conferences and meetings in the USSR and also abroad. However it is being solved in different ways. Numerous researchers recommend the use, for sterility prophylaxis and therapy, of various artificial means, especially hormonal and neurotropic preparations and they are devoting very little attention to physiological and natural means. At the same time, as pointed out by V.I. Lenin, "we still are not familiar with the law of nature. It exists and operates beyond our perception and makes us slaves of 'blind necessity'"**. An all powerful law of nature and everything that lives is the need to multiply and bear fruit. The specialists must recognize this law and utilize it skilfully in carrying out their daily practical work. The mastering of the laws of propagation is making it possible not only to orient ourselves properly, to ascertain the reasons for fertility and to outline methods for eliminating them but also to control the processes of propagation.

Extensive studies have shown that the day is not far off when, under production conditions and using the method of zygote transplantation, we will be able to obtain up to 40-50 valuable offspring annually from one outstanding cow. With regard to today's practice, there are many reasons for sterility and they have been studied well. One of them has to do with poor quality feeding, caused by a feed deficit or low quality feed, particularly hay, silage and haylage. Such feeding adversely affects the reproduction functions of animals and especially young females. Thus, how is it possible to discuss the use of artificial and "miraculous" stimulants which clearly eliminate fertility, at farms where the livestock are not supplied with full-value feed throughout the indoor maintenance period and during the summer they have only poor pastures at their disposal?

In recent years another extreme has been observed -- physiologically and economically unsound increases in the proportion of concentrates in the feed ration (up to 400-600 grams per kilogram of milk). The overfeeding of animals with concentrates, malt residue, brewing waste and pulp residues tends to disrupt rumen digestion, giving rise to strong acidosis and fat degeneration in all internal organs, especially the liver [14]. The metabolism is disturbed and hardening of the arteries of the uterus and ovaries and many other dystrophic processes are

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* Brezhnev, L.I. Speech during meeting in Central Committee of Communist Party of Kazakhstan. KOMMUNIST, No. 13, 1980, p 7.

** Lenin, V.I. "Materializm i empiriokritsizm" /Materialism and Empiriocriticism/. Complete Works, Vol. 18, p 198.

being observed. All of these factors are contributing to the development of sterility, with a prolonged absence of reproduction cycles (anophrodisia) or repeated unsuccessful inseminations owing to various defective reproductive cycles.

According to the materials of S.V. Shilin [15], under conditions involving the overfeeding of 44 animals observed over a period of 2 years, only 14 (31.7 percent) were impregnated and the remainder were culled out. If pregnancy occurs, it is only during the extremely late periods following birth (5-6 months or more later) and this results in the premature steaming up of the cows, with 8-10 percent of the animals aborting. Owing to weak dilations among such cows, the fetus must be taken artificially (dead in 10 percent of the cases). The most frequent complication in births -- retention of the afterbirth (25-50 percent) as a result of an unusually strong union between the fetal portion of the placenta and the mother. Here not one of the existing uterine methods produces a positive effect and thus the afterbirth must be obtained surgically. Subsequently, owing to a strongly expressed uterus atony and its infection, as a rule sub-involutions, afterbirth endometrites and other complications arise, all of which lead to sterility. In the final analysis, the life spans of the animals are reduced sharply (3-3.5 lactations) and weak offspring are obtained. This is why the overfeeding of animals with concentrates is considered to be more harmful than underfeeding, during which the reproduction function is restored more rapidly.

Sterility in animals is generally considered to be a very complicated biological phenomenon and one which is caused by many extremely diverse factors. In this regard we must not underestimate, although there is no point in overestimating, the importance of the feed factor in the development of sterility. Even on the same farm, with use being made of the same feeding level, some livestock breeders obtain healthy offspring and high yields on a regular basis while others do not.

For example, the complexity of the problem under review is borne out by the fact that even under ideal conditions for livestock maintenance, mass sterility may develop in cows if the rut heat period is incorrectly determined or missed, if the specialists are not properly skilled in carrying out reproduction work, if poor quality sperm is employed or if the insemination is carried out under unsanitary conditions and efficient control over its effectiveness is lacking, especially during the first 3-4 weeks.

Distinct from field crop husbandry where sowing work is carried out once or twice annually, in dairy cattle husbandry the "sowing" work takes place each day, 2-3 times daily, but it is not always carried out in a high quality manner. At the present time, these factors of a physiological and organizational nature are causing a low yield in offspring. This same conclusion was drawn by foreign specialists, albeit considerably later. Owing to incorrect determination of the rut heat period, missing it and the lack of physiological preparation of females for insemination, owing to the absence of a natural (innate) drawing together of animals of different sexes, (wherein complicated and diverse reactions to smell, sound, visual and tactile irritants arise and manifest themselves in an intensive manner irritants which in the strongest possible manner activate the sexual function), the cows and heifers remain sterile more often than all other factors taken together.

In addition to studying thoroughly the causes and forms of sterility (innate, senility, alimentary, climatic and others), our science, based upon thorough studies of the physiology and pathology of sexual processes during various reproduction periods, has uncovered a number of important conditions of theoretical and great practical value in the daily work carried out in connection with the reproduction of animals.

We studied the sexual cycle of cows and heifers during various seasons of the year, the motility of the uterus, pregnancy, births, the postnatal period and also their dependence upon environmental factors, a number of biological agents and preparations and the influence of consolidated calvings carried out over a period of many years, test males and missing of the rut heat periods on the reproductive function of cows. New operational methods have been developed for preparing bulls, rams and test boars and also methods for employing them for the purpose of ascertaining the rut heat period, stimulating the sexual function and diagnosing pregnancy and sterility during the first month following insemination and the effectiveness of various methods for selecting the time of insemination, the insemination multiplicity factor, the schedules and methods for treating cows which are holding back the afterbirth, postnatal endometrites, persistent yellow body and hypofunction of the ovaries have been established.

The study of the sexual cycle of cows and heifers during various seasons of the year revealed that their ovulation takes place not during the middle or towards the end of the rut heat period, as was earlier thought, but rather 10-15 hours later following the end of the rut heat period, which during the summer lasts an average of 16 hours and in the winter -- 13.8 hours, but by no means 3-36 hours or 2-3 days [16]. It should be remembered that neither the rut heat period nor ovulation are strictly constant of stable processes and they are definitely not dependent upon environmental factors. For example, the intercourse of replacement heifers and sows with test males, combined with two or more coituses, shortens the rut heat period and accelerates the onset of ovulation [16, 20]. Hence it follows that we can and must control the sexual processes of animals.

This and other data cited here, confirmed by operational practice in various zones throughout the country and abroad, have served as the foundation for organizing the entire system of expanded reproduction for large-horned cattle. As a result of the accumulation of the mentioned materials, further study was given to the new teachings concerned with the sexual cycle, sterility and neurohumoral regulation of the reproductive function, as formulated by an eminent gynecologist-obstetrician of our time, A.P. Studentsov [9-11]. The physiological and economic feasibility for intensifying the reproduction of animals through consolidated deliveries and the carrying out of calvings in boxes has been substantiated and a solution has been found for one of the most complicated problems of animal reproduction -- the optimum time for their fertilization has been found [16]. Our domestic science occupies leading and eminent positions in terms of all of these most important problems, with the scientific organization of expanded reproduction of the herd being dependent upon solutions being found for them.

The methods for intensifying the reproduction of animals have been clearly defined. The principal ones are as follows.

The first method -- the intensive raising of replacement females, their timely fertilization (heifers not later than 16-18 months, sows -- 9-10 and ewes -- 12-18 months) and good preparations for deliveries. Importance is attached to having several sexual cycles prior to the planned fertilization of the heifers, sows and ewes; this provides the required development of the sexual system and mammary glands. Neither from a physiological nor economic standpoint is it considered advisable to delay the periods for fertilizing the replacement females. The cost of raising first heifer cows when the impregnating of replacement heifers is delayed until 24 months of age increases by 30-40 percent. Functional impairment of the ovaries and uteruses inevitably appears in such heifers and reductions take place in the activity of biochemical processes in the tissues of the sex glands and in the number of maturing follicles [2]. In the case of first deliveries, various complications often arise during the delivery and postnatal periods and, as a result, sterility develops, a reduction takes place in milk productivity and the life spans of the animals decline.

However, here we must also not resort to extremes. For example, recommendations have appeared for fertilizing eqes at the age of 7-8 months [13]. Our special studies have shown that in the case of ewes of the Romanov strain the sexual organs do not reach their optimum development until the animals are 8 or even 10 months of age [18]. Over a period of two deliveries, the best fruitfulness and quality of the offspring were obtained from ewes which were fertilized for the very first time at the age of 12-13 months. Their daughters were also more fruitful than other animals of their same age but which, like their mothers, were fertilized at the age of 8-10 months.

Over a period of two lambings, 100 12-13 month old ewes produced 464 lambs annually, while at the same time 8 month old ewes produced 376 lambs. But this is by no means the ceiling. For example, the sheep raising department at the Krasnogorsk Poultry Factory is obtaining 545-576 lambs. The biological potential of Romanov sheep is exceptionally high and yet we still have not uncovered it fully. In fact, even that which we are familiar with we are still not utilizing properly.

The experience of leading workers at commodity farms has shown that replacement sows should ideally be fertilized at the age of 9-10 months at a live weight of 115-120 kg and on breeding farms -- 135-140 kg.

The recommendations cited concerning the age for the first fertilization of replacement females differ sharply from similar recommendations which appeared during the 1950's, at which time the need for delaying the fertilization periods for young females until their maximum development (heifers -- 2 years, sows -- 12 months and ewes -- 1.5-2.5 years) was erroneously advocated.

The task of science consists of uncovering opportunities for reducing still further the periods for the onset of physiological maturity and in actual practice -- to take advantage of these opportunities and in this manner raise the effectiveness of use of replacement females.

The second method for intensifying reproduction -- the intensive use of adult (aprous) females, which is achieved by condensing the deliveries (that is, fertilization during the first month). This decisive method for intensifying

reproduction operations and preventing sterility also makes it possible to solve successfully three large tasks in dairy cattle husbandry.

1. To raise the yield of offspring by a minimum of 10-15 percent, that is, to obtain 110-115 or more calves from every 100 cows (a portion of the cows calve twice annually -- 1st and 4th quarters, 2-3 percent of the cows produce twins and this also brings about an increase in meat production.

Taking advantage of the physiological capability of cows prior to the onset of pregnancy, during the 1st month following birth, it is possible at conventional farms to achieve fertilization in all cows in a herd over a period of 50-60 days following deliveries. Thus, according to data supplied by S.P. Petrov [7], 16,982 cows that were inseminated during the 1st month were in the final analysis fertilized 51.3 days following deliveries. In this instance, no less than 108 calves were obtained from every 100 cows (even in the absence of twins). With a further reduction in the fertilization periods for the cows and taking twins into consideration, the number of offspring obtained increased. For example, in 1981 the livestock breeders at the Avrora Kolkhoz in the Chuvash ASSR obtained 115 calves per 100 cows.

2. To increase the milk yields through a more rational distribution of the milking days with condensed calvings. It is known that with 300-day (continuous) dairy operations (with fertilization after 90 days), during the 9th and 10th months of lactation the cows produce less milk than during the 1st and 2d months. Thus if cows are fertilized during the 1st month, then their annual milk yield consists of milk yields obtained during 240 days of the current and 60 days of the next lactation and thus it follows that the average milk yields for such cows, for each day and for the year as a whole (and not a lactation) are always higher than those for cows operated continuously for 300 days. This fact is well understood by leading livestock workers, all of whom are taking the necessary measures to ensure the fruitful insemination of the cows during the first month following deliveries, in the interest of obtaining a maximum number of offspring and a maximum amount of milk. Thus, a well known milkmaid in Zhitomir Oblast, L.F. Savchenko, annually (in a computation for 100 cows) obtains 120 or more calves and a milk productivity in excess of 7,000 kg. As early as 1956, at the VSKhV /All-Union Agricultural Exhibition/, an operational experiment was carried out by livestock breeders at the Kuchino Sovkhoz in Moscow Oblast in which all of the cows in the herd were fruitfully inseminated 35 days following deliveries. A milkmaid at the Kolkhoz imeni K.Ye. Voroshilov, Hero of Socialist Labor M.F. Luk'yanova, obtained six calves from a cow over a period of 5 years. Following each of five calvings, pregnancy commenced on an average of 26 days later, with the annual productivity being in excess of 5,000 kg of milk. In 1978, at the Milet OPKh /experimental model farm/ in Moscow Oblast, in a computation for 100 cows, (with an absence of twins, in a group of 40 animals) obtained 97 calves and 3,239 kg of milk, in 1979 -- 108 calves and 3,744 kg and in 1980 -- 118 calves and 4,724 kg of milk. In 1980, at the Kolkhoz imeni 16th Anniversary of October in Vladimir Oblast, from 430 cows which were fertilized within a month following deliveries 4,031 kg of milk were obtained annually, or 423 and 643 kg more than that for cows fertilized 31-60 days later (314 head) or 61-90 (136 head) days following deliveries.

3. To preserve the health and prolong the lives of the cows through the introduction of condensed calvings (by means of 240-day non-exhausting lactation and the timely onset of the interlactation period).

Beyond any doubt, pregnancy brings about noticeable changes in the organism of the females. However, a cow's organism experiences the greatest tension during the lactation period, especially during the 2d and 3d months. During this period and compared to the 1st month, the cardiac rhythm speeds up somewhat, the electrical systole of the ventricles becomes longer and an increase takes place in the systolic indicator, the calcium and phosphorus content in the skeleton decreases and a reduction takes place in the alkali reserve in the blood. With the onset of fertilization, a remarkable biological phenomenon takes place which is expressed in the hyperfunction of all of the systems and organs. As a result, increases take place in the animals' appetites and state of nourishment and considerable quantities of nutrients are deposited in the organism. Under normal maintenance conditions, pregnancy strengthens the organism of an animal and prolonged continuous lactation disrupts it. This is convincingly borne out by the materials of experiments carried out over a period of many years at the Shchapovo and Dubka training farms of the TSKha /Timiryazev Agricultural Academy/ using the same cows (commencing with the first calving), which with normal maintenance, feeding and purposeful organization of reproduction operations over a period of five calvings were fertilized during the first weeks following deliveries and thereafter remained healthy and highly productive [16]. Thus the Tunik cows (Inventory No. 848), on five occasions in a row), were fertilized on the average 33 days following deliveries and their annual productivity amounted to 6,280.4 kg of milk.

Each cow in which the stage of excitation of the sexual cycle does not appear during the first month following a delivery must be thoroughly studied and the causes of this abnormal phenomenon corrected immediately. Subsequently, during lactation, the organism of a cow inevitably becomes weaker and the effectiveness of measures aimed at restoring fertility decreases. This is a common biological phenomenon. It has long been known that sows lose weight during the suckling period and, as a result, the onset of the stage of excitation of the sexual cycle is delayed. But it is only necessary to remove the young pigs and thereafter, within 5-7 days, strong rut heat is observed in the sows. According to the data obtained from studies carried out over a period of many years by A.V. Kvasnitskiy [4, 5], the physiological strain of the metabolic processes in sows during the pregnancy period (10 young pigs in 115 days) is ten times less than that during 60 days of lactation. In the process, the earlier the young pigs are removed the shorter the lactation and the less dunctional strain on the organism of the sows and, as a result, the more rapidly the next pregnancy takes place. Actually, 2.8 weanings annually (for an early weaning of young pigs) require from a sow a total of only 62,700 kilocalories of the 692,600 which it expends for two weanings and two lactations [4, 5]. Thus, when the conditions are right (safeguarding and raising of 10-day old young pigs and so forth), a real opportunity becomes available for obtaining 2.8-2.9 farrowings annually (up to 40 or more young pigs), with good health in the sows and high resistence and good live weight in the newly born young pigs (up to 2.25 kg). In experiments carried out by L.A. Konyukhovaya [6], experimental sows were fertilized an average of 13.7-15.8 days following each of four farrowings.

But in order to achieve intensive use of the females, an active influence must be brought to bear upon the organism of the animals.

One mandatory condition for a normal course for pregnancy, deliveries, the postnatal period and manifestation of the sexual function during the first month following deliveries (in addition to full-value feeding and correct operations) is that of ensuring that the cows exercise actively throughout the year. Active movement prior to and following deliveries (commencing on the third and fourth days) exerts a very strong influence on the organism of cows (improvement in the skeletal structure, and an increase in the color index, in the acid capacity of the blood and in the content of common protein, calcium and inorganic phosphorus in the blood). Active motion activates all stages of the birth act and shortens considerably the postnatal period.

By means of daily and active exercise alone (five sixths of a kilometer daily) during the indoor maintenance period, it is possible to increase the yield of calves by 12-14 percent and to raise the milk yield of each cow by 382-416 kg annually (for a productivity of 3,000 kg).

If the cows are not provided with active exercise in the interest of avoiding various complications during deliveries and in the postnatal period, it will be impossible to prevent the development of sterility. Experience reveals that none of the medical preparations can substitute for motion, especially when combined with natural insolation -- the strongest biological stimulator of vital activities in plant and animal organisms [12].

There has not been one case recorded either in our country or abroad of 100 calves being obtained from 100 cow in the absence of active exercise. In this regard, we view cultivated pastures as being not only a cheap source for green feed but also as a fine sanatorium for guaranteeing the health of the animals, their high fertility and, it follows, their high productivity. Nor is it an accident that dairy cattle are maintained only on cultivated pastures in such countries as England, Holland and others during the summer-pasture period.

A test male serves as a powerful and completely irreplaceable stimulant for the sexual function in the females. Our studies carried out over a period of many years and the work of many other scientists and practical workers indicate that the stimulation of the sexual function in cows by a test bull (in the morning and evening for 1.5-2 hours), commencing on the 3d to 4th day following deliveries, exerts a positive effect on the involution of the sexual organs and on the onset of the full stage of excitation of the sexual cycle, it intensifies to a considerable degree the motility of the uterus and the morphological processes, it shortens the rut heat period and it accelerates the process of ovulation. In the case of heifers and sows raised in isolation from males, the sexual organs do not reach their optimum development by the mating age of the animals, proper morphological preparation is lacking and pathological changes appear in the type of glandular-cystic formations in the epithelium and so forth. The sexual organs in 5-8 percent of the young females generally remain underdeveloped (infantilism) and this results in innate sterility. For example, in 1981 at the Konstantinovo State Breeding Plant in Moscow Oblast, 29 of 564 replacement sows (5.1 percent) were culled out as a result of infantilism of the sexual organs (complete

anaphrodisia) and other anomalies of the sexual function, all of which caused repeated unsuccessful inseminations -- 33 head (5.8 percent). When the sexual function of heifers is stimulated by a test bull, the hormone producing structures of the ovaries are activated and this is expressed in a thickening of the granulose and internal theca of the cavity follicles and increases take place in the height of the epithelium of the conductive sexual paths and in the thickness of the muscular membrane of the oviducts and the mucous and muscular membrane of the uterus [22].

When replacement females have assigned contacts with test males, an increase takes place in the number of full-value sexual cycles and the intensity of their manifestation is raised. This brings about not only improved development and preparation of the conductive sexual paths for creating the conditions required for fertilization and, it follows, an increase in fertility, but in addition it also results in improved development of the mammary gland. This is why the use of bulls, rams, boars and test stallions as natural stimulators for bringing about a physiologically full-value stimulation of the sexual function in the females is a vital necessity.

In cows, just as in all other animals (sheep, hogs, horses), it is impossible to determine the presence of rut heat accurately either visually or by using various instrument or other means, since it appears to be a strictly specific (sexual) reaction of a female to a male, to the stimuli which he emits, the chief one of which is odor. But in order to achieve 100 percent manifestation of the rut heat, it is necessary for the female to be subjected to visual, sound and tactile stimuli. And this is possible only through individual contact of a female with a male in a specially set aside pen (the test is carried out in the morning and evening for a period of 1.5-2 hours each). Thus, wherever and under what ever conditions the rut heat (that is, the nervous reaction of a female to a male) manifests itself, it can only be determined in a reliable manner with the aid of a test animal. Failure to employ this test method inevitably leads to missing the rut heat period (up to 40 percent or more), incorrect selection of the time for insemination, a delay in the next stage of excitation of the sexual cycle following an unsuccessful insemination. Studies [16, 17] have shown that when the indicated method is not employed up to 30 percent of the animals delivered to artificial insemination stations are not in the rut heat state. During the indoor maintenance period, the percentage of mistakes made in determining the rut heat period and the number of times that this period is missed increase considerably when the test method is not used. The test animals indicate even those cows and heifers in rut heat in which the signs of sexual excitation are extremely weakly expressed or lacking entirely (unresponsibe cycles). Thus the use of test bulls, prepared using the operational methods proposed by us, is expanding with each passing year. For example, test bulls (one for every 150-200 cows) have already been in use for 18 years on farms in Lvov Oblast.

According to data provided by A.I. Sergiyenko [8], over a period of 12 years in which test bulls were used with 1.08 million animals, the stage of excitation of the sexual cycle was manifested in 38.1 percent of the cows during the 1st month following deliveries, with the average fertilization rate from the first insemination being 70.6 percent (fluctuations from 69.6 to 71.9 percent). Neither in our country nor abroad have such results been achieved in the absence of test animals. Nor was it noted that over a period of 5 years the sterile period in cows

which did not have contact with test bulls lasted an average of only 12.35 plus or minus 4.07 days [16]. At the Kolkhoz imeni 16th Anniversary of October in Vladimir Oblast, from 1 August to 31 December 1981, 140 cows which did have contact with test bulls (from the 3d to the 5th days following deliveries, for 1-1.5 hours in the morning and evening) were fertilized by means of artificial insemination on the average 37.3 days following deliveries. Many such examples can be cited and all of them convincingly testify to the fact that the use of test bulls is economically very profitable.

The expenses for feeding and maintaining young and growing test bulls are repaid not only in the form of additional calves (12-15 percent) being obtained, but also in terms of these bulls being sold for meat purposes after they have been in use for 1-1.5 years.

At the present time, based upon experience accumulated in the USSR, test animals are being employed extensively in Australia, New Zealand, England, Canada and especially in the U.S.A. where several thousands of test bulls are employed annually.

A study of the physiology and pathology of deliveries and the postnatal period has made it possible to furnish scientifically sound recommendations on the prevention and treatment of various complications (retention of afterbirth, sub-involution of the uterus and others). The prophylactic measures include: the preparation of cows and non-calving young cows for calving as a decisive factor for obtaining healthy offspring, preventing abnormalities during deliveries and the postnatal period; organizing delivery sections and their correct operation and calvings in boxes [19,21]. In boxes the cows are not tethered and they can freely select physiologically convenient positions for their deliveries. In such a quiet and calm atmosphere the births take place more rapidly as a rule and without any complications. Yes and the most favorable conditions are created when the calves are initially maintained in boxes alongside their mothers. In such instances, the calves, which are licked clean all over by the mothers for a period of 45-60 minutes, stand up earlier and the food reflex appears in them more rapidly -- accomplished physiologically (naturally) by means of sucking. This is of decisive importance with regard to raising the immune resistance of the newly born calves.

Indeed, it is precisely a delayed colostrum (inevitable in the case of old delivery technologies) which leads to a situation wherein a calf, in whom the food reflex as the saying goes will not wait, licks foreign objects clean and thus brings foreign (pathogenic) microflora into its digestive tract. And this is one of the chief causes of gastrointestinal diseases and the loss of newly born calves. However, this is beneficial for the mother-cows. When thoroughly licking clean its newly born calf, a cow swallows amiotic fluid which is rich in biologically active substances (hormones, carbohydrates, proteins and others), which in combination with repeated suckling by its calf intensifies the uterine contractions considerably, thus accelerating the separation of the afterbirth and the prevention of the appearance of endometrites and other diseases. In the process, the swelling of the mammary gland disappears more rapidly and mastitis, which usually appears during the first days of the postnatal period, does not occur.

Five days later the calves are transferred from their boxes to a sectional veterinary dispensary [6]. In each section, and there are no less than four of

them, the newly born calves are placed for a period of 2-4 days. If during this period of time the section is not filled up, then work is started aimed at filling up the next section. Calves which are 14 days of age are moved into a calfhouse or transferred to other farms for maturing. The consecutive filling up of the sections of a dispensary with animals of roughly the same age makes it possible to create the best microclimate and to reduce sharply the concentration and degree of virulence of pathogenic microbes and this prevents the onset of diseases.

The mentioned technology for obtaining and safeguarding newly born calves has been approved by VASKhNIL, the USSR MSKh [Ministry of Agriculture] and the RSFSR MSKh and it was valued very highly during the 11th World Veterinary Congress. It can be employed equally well at a modern dairy complex and also on conventional farms. It requires only simple modernization of the usual delivery sections and dispensaries. There are already thousands of farms in Russia where, following the introduction of this system, a considerable reduction took place in the number of gastrointestinal diseases in newly born calves. Similarly in the case of cows, reductions were noted in the frequency of various delivery and postnatal complications and in diseases of the mammary glands.

During the first days of the postnatal period, no attempt should be made to accelerate an increase in milk yield, since this could retard involution of the sexual organs. Commencing on the 3d and 4th days following deliveries, active exercise can be resumed, stimulation by a test animal can be employed and dispensary obstetrics combined with massaging of the sexual organs can be carried out.

In the stimulation of the sexual function, a definite role is played by specific biological preparations (SZhK, KZhK and others), which stimulate the polycarpic effect in animals. The experience accumulated in karakul breeding has shown, for example, that the use of these valuable preparations can produce great profits. But to use them for the purpose of combating mass sterility (as is often done) is not only inadvisable but extremely harmful as well. The use of any artificial stimulants for sterility purposes must be strictly individual and only on the basis of strong medical indications. Leading animal husbandry workers are achieving high yields of offspring without having to resort to the use of artificial stimulators. Moreover, they are not even aware of their existence.

In the interest of increasing the yield of viable offspring, use must be made only of sperm having a high fertility capability (70 percent from the first insemination); the number and quality of the offspring will depend to a considerable degree upon the use of such sperm. Once the heifers and cows are proven to be in heat by a test bull, they are immediately inseminated and if they are still in heat 10-12 hours later the insemination is repeated. As a result, the yield of calves increases by 9.7-13.5 percent [16], 23]. Obviously, the artificial insemination work must be entrusted to highly skilled specialists who possess a fine knowledge of veterinary gynecology and are materially interested in this work. In those areas where proper conditions are not available for obtaining high yields of offspring through artificial insemination, correct use should be made of pure-bred sires and the method of natural insemination. One method should not be employed in opposition to the other, but rather they should be skilfully combined in the interest of obtaining the best final results.

With the conversion of animal husbandry over to an industrial basis, the problem of intensifying reproduction of the herd is becoming more urgent, since many effective methods are not always included in the technology, nor are they being employed successfully. And here our science has found a successful solution, having proposed a departmental system for reproduction of a herd at complexes and large dairy farms. The principal elements of this system have been employed successfully since the 1950's at the Shchapovo Training Farm of the TSKhA, where over a period of 8 years 108 calves have been obtained from every 100 cows, with the milk productivity being 5,300 kg. Here there were three departments (in accordance with the former terminology -- three livestock yards): for dry cows, a delivery section with a dispensary and for cows which have calved and are subject to insemination and to increases in their milk yields. This system was subsequently introduced into operations on a number of farms in Moscow Oblast and thereafter in Ulyanovsk and Lvov Oblasts.

At the present time, this system, known as the "Lvov flow-line-departmental system for milk production" (departments: dry cow, delivery section, insemination and increased milk yields, milk production), is considered to be the most effective and promising [1]. It makes it possible not only to increase the milk yields of cows but also to obtain a maximum number of healthy offspring. In addition to the 4-department system, some oblasts, krays and republics are employing a 3-department system (departments: dry cow; delivery section; insemination, increased milk yields and the obtaining of milk). This system can be introduced into operations successfully on any farm.

Such are the principal means for intensifying reproduction and preventing sterility in cows. Only the daily and planned implementation of a complex of agricultural-zoological-veterinary-organizational measures, involving the use primarily of powerful natural means of influence (insolation combined with active movement, full-value feeding and test bulls) and efficient organization of the entire system of insemination will make it possible to solve successfully the problem of the prevention and elimination of sterility, safeguarding the offspring and, it follows, increasing the number of livestock and their productivity and lowering considerably the production costs for animal husbandry products.

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AGRO-ECONOMICS AND ORGANIZATION

DEVELOPMENTAL PROBLEMS OF AGROINDUSTRIAL INTEGRATION DISCUSSED

Moscow IZVESTIYA TIMIRYAZEVSKOY SEL'SKOKHOZYAYSTVENNOY AKADEMII in Russian No 6, Nov-Dec 82 pp 30-40

/Article by M.P. Vasilenko, Department for the Organization of Socialist Agricultural Enterprises: "Problems of Agroindustrial Integration"/

/Text/ The creation of enterprises, combines and associations in which agricultural and industrial production are combined is a specific manifestation of agroindustrial integration.

During the 1975-1980 period, the number of production APO's /agropromyshlennoye ob"yedineniye; agroindustrial association/ increased from 69 to 150. They unite 1,261 agricultural enterprises, 624 processing plants and industrial departments, 85 procurement, transport, trade and other organizations. In addition, by the end of 1980 there were 604 APP's /agropromyshlennoye predpriyatiye; agroindustrial enterprise/ operating within the country which were not included in the structure of agroindustrial associations.

The average annual number of all workers at APF's /agropromyshlennoye formifovaniye; agroindustrial formation/ is in excess of 1.43 million individuals, of which number roughly 1.08 million are engaged in production operations. The APF's have almost 6.5 million hectares of agricultural land at their disposal, including more than 3 million hectares of arable land, 204,000 hectares of orchards of fruit-bearing age and more than 438,000 hectares of vineyard space.

By the end of 1980, the value of the fixed capital of APO's and APP's had reached almost 14.5 billion rubles, including fixed productive capital -- 11.9 billion rubles.

During the 1975-1980 period, the average annual number of workers at APF's increased by a factor of 1.6, the area of their agricultural lands -- by 1.7, the value of the fixed capital -- by 1.9 and fixed productive capital -- by a factor of 2.1.

In 1980 the APF's produced more than 4 billion rubles worth (in 1973 prices) of gross agricultural output and 4.2 billion rubles worth (in 1975 prices) of gross industrial output, or 19 and 80 percent more respectively than during 1976. The APF's produced 38 percent of the all-union production of canned vegetable goods,

tomato products -- 53 and fruit -- 73.8 percent. The APF's produced considerable volumes of wine and wine materials -- 93.6 and 451.6 million decaliters respectively.

The APF's sold 10.3 billion rubles worth of products in 1980, that is, 36.6 percent more than the figure for 1976. Here it is important to note that a considerable and ever increasing portion of this output was made available for sale in processed form: during the period under review the APF's increased the total amount of processed products sold from 3.7 billion to 5.6 billion rubles worth (according to the actual sales prices).

The agroindustrial enterprises and associations appear as large-scale production formations, as convincingly borne out by the data in Table 1.

TABLE 1.

Data for USSR Agroindustrial Enterprises and Associations
(on the average for 1980)

Indicators	Enterprise	Association
Average annual number of all workers, including	883	6377
those engaged in the principal production operations	487	5627
Value of fixed capital at end of year, in thousands of rubles	10224	58704
including fixed productive capital	8125	49459
Area of agricultural lands, in hectares	4958	24670
including arable land	2659	10083
Gross output produced, in thousands of rubles:		
for agriculture (in 1973 prices)	2947	16200
for industry (in 1975 prices)	2261*	29596
Earned from the sale of all products, in thousands of rubles	5184	51000
Profit obtained from the sale of all products, in thousands of rubles	1113	5949

* Processed products sold according to actual sale prices.

The relatively small areas of agricultural lands at the associations (compared to conventional agricultural enterprises) are explained by the fact that the APO's and APP's have a high proportion of areas occupied by orchards and vineyards. Thus, on the average for every APP engaged in the production of vegetables, fruit and their processing into canned goods and wine, there are 370 hectares of perennial plantings of fruit-bearing age and approximately 120 hectares of vegetable crops grown outdoors and for every APO of this specialization -- 1,800 and 1,170 hectares respectively. APP's specializing in the production and processing of grapes and fruit into wine have on the average 200 hectares of orchards of fruit-bearing age and approximately 300 hectares of vineyards and APO's -- 480 and 4,660 hectares respectively, with the proportion of fruit and vineyard plantings of fruit-bearing age, compared to the overall area of agricultural lands, being in excess of 16

percent. APO's specializing in the production and processing of vegetables into canned goods grow vegetable crops outdoors on an average of approximately 20 percent of the entire area sown in crops.

TABLE 2

Yields, Production Costs and Labor-Intensiveness in the Production of Grapes, Fruit and Vegetables at APF's and Specialized Sovkhozes and Kolkhozes in the USSR (1980)

Indicators	APP's and APO's	Grape and Fruit-Berry Sovkhozes of the USSR Ministry of Agriculture	USSR Kolkhozes
Grapes:			
cropping power of plantings of fruit-bearing age, in quintals per hectare	71.7	55.6	52.7
production cost per quintal, in rubles	28.40	36.23	25.00
labor expenditures per quintal, man-hours	11.2	16.9	14.1
Fruit:			
cropping power of plantings of fruit-bearing age, in quintals per hectare	54.1	41.1	18.4
production cost per quintal, in rubles	19.13	23.10	18.74
Vegetables grown outdoors:			
cropping power, in quintals per hectare	178.6	142.2	130.6
production cost per quintal, in rubles	11.0	15.99	11.96
labor expenditures per quintal, man-hours	5.6	9.0	7.4

Specialization in agricultural production is being developed at higher rates in agroindustrial formations than it is on other farms and it has achieved a relatively high level. For example, in 1980 the fruit, grapes and vegetables produced at USSR APO's (excluding APO's of an essential oil type) constituted on the average 70.8 percent of the value of all agricultural products sold by them to the state.

The large dimensions of the APF's and the relatively high level of concentration and specialization in their production operations are making it possible to employ modern equipment, technologies and production organizations on an extensive scale and this in the final analysis is ensuring high results for them.

It is apparent from Table 2 that the yields for grapes, fruit and vegetables, that is, the products of the principal crops of the agroindustrial enterprises and associations are 30, 31.6 and 25.6 percent higher respectively than those for sovkhozes of the USSR Minsel'khoz /Ministry of Agriculture/ which are specializing in the production of the very same products and the production costs per unit of output are 21.6, 17.2 and 31.2 percent lower. Direct labor expenditures for the production of 1 quintal of grapes are less by 33.7 percent and for vegetables -- by 37.8 percent.

The most typical feature of APF's, as is well known, is the combining of both agricultural and industrial production in a single economic organism. Their relationship provides the principal production and organizational structure for APF's of different production types (see Table 3).

TABLE 3

Relationship Between Agricultural and Industrial Production Operations (in % of total) in USSR APO's of Various Specializations (1980)

Indicators	Principal Production Specialization By Types of Processing of Agricultural Products				
	Winemaking (fruit, grapes)	Canning (vegetables, fruit)	Mixed Types of Processing (winemaking, canning)	Essential Oils	Average
Number of associations	70	39	20	12	-
Number of workers engaged in principal production:					
in agriculture	94.2	68.4	89.8	89.1	87.4
in industry	5.8	31.6	10.2	10.9	12.6
Fixed productive capital:					
in agriculture	80.8	61.2	82.3	81.7	76.8
in industry	19.2	38.8	17.7	18.3	23.2
Gross output:					
in agriculture	31.2	42.0	60.8	37.1	35.4
in industry	68.8	58.0	39.2	62.9	64.6

Analysis reveals that the principal portion (87.4-76.8) of live and materialized labor in the means of production is concentrated in the agriculture of APO's and that its gross output constitutes slightly more than one third (35.4 percent). Industrial production with a fewer number of workers (12.6 percent) and less fixed productive capital (23.2 percent) produces a large portion of the gross output (64.6 percent). At the same time and depending upon the specialization, the relationships between the principal elements of the organizational-production structures of APO's differ considerably. For example, at fruit and vegetable canning APO's the proportion of industrial production in the expenditures of live and materialized labor is considerably higher than at other APO's. The proportion of industry in gross output fluctuates from 68.8 percent in winemaking APO's to 39.2 percent in APO's engaged in mixed types of processing.

The combining of agricultural and industrial production in APP's and APO's, their large dimensions, the higher levels of concentration and specialization, the cropping powers of the principal crops and other advantages offered by the new forms for organizing production are making it possible to achieve a relatively high profitability for their production operations.

Thus, during the 10th Five-Year Plan (1976-1980), at APP's which specialize in the production of fruit and grapes and their processing into wine and also which

specialize in the production of vegetables and fruit and their mixed processing into canned goods and wine, the production prifitability fluctuated by years from 31 to 38 percent.

All of this testifies to the fact that the new forms for organizing agroindustrial type production operations, despite the fact that they have been in existence for only a brief period of time, have proven their worth and can be viewed as being extremely promising. This is especially true in view of the fact that as yet the full potential of the APP's and APO's has by no means been uncovered or utilized. In essence they have passed through only one of three stages in their development, namely the stage of organizational formation. And only a few of them are in the second stage, that is, the stage of improving their structure in conformity with the function of the enterprise or association.

The majority of the agroindustrial formations were created in the absence of a specific organizational-economic justification and in a number of instances this led to a lack of balance in the development of their principal production subunits, primarily agricultural and industrial. It is sufficient to cite the following example. In 1980, all of the country's APO's (excluding le APO's for the production and processing of essential oil products and other crops) procured approximately 1.28 billion rubles worth of agricultural products for processing, including 784 million rubles worth or 61.1 percent from their own agricultural enterprises. At APO's which specialize in the production and processing of fruit and vegetables into canned goods, the proportion of internally produced raw materials compared to the overall processing volume amounted to only 47.8 percent, whereas at APO's having mixed types of processing (winemaking and canning) of vegetables, fruit and grapes -- 53.4 percent.

Quite often there have been incidents of a lack of balance existing between the production, trade, transport and certain other servicing subunits of APO's. This factor and also imperfections in the system of interrelationships and the absence of a single administrative mechanism for the activities of enterprises of the various branches belonging to associations have at times led to instability in the APO structures and to their reorganization.

Hence, we consider one important problem associated with the development of agroindustrial integration to be that of improving the organizational-production structure of existing agroindustrial formations and the organizational-economic validation of the structure for each newly created APO or APP.

A number of measures must be carried out aimed at further raising the level of production specialization and concentration in agricultural branches of APF's, especially in vegetable growing and horticulture, such that the industrial subunits will be fully supplied with internally produced raw materials. On farms specializing in grape production and winemaking, intravarietal specialization should ideally be intensified (up to 5-6 varieties of industrial grapes for various ripening periods).

Operating APF's should pass through the second stage in their development -- improvements in their organizational-production structures -- based upon accumulated experience and the results of scientific studies and subsequently they

should convert over to the third stage -- the development of an adequate APF essence for the administrative mechanism of interaction for integrated components, which is understood to mean a planned harmonization of their interests and achieving an optimum operational regime for all subunits of the APF using economic methods, in order to realize the maximum possible increase in the production of the final product with minimal expenditures for its production.

In recent years the process of creating APF's has slowed down somewhat. Compared to 1976 when the number of APO's increased by 51 units compared to the previous year, in 1980 -- an increase of only 10. In 1976 the number of APP's increased by 22 and in 1980 the number remained at the 1979 level. There were many reasons for this reduction in the establishment of APO's and APP's. Following the creation of the initial APF groups, a period of time was required for accumulating experience in their operation and for uncovering their positive aspects and shortcomings, for the purpose of multiplying the former and eliminating the latter in future operations. Other restraining conditions also included different departmental subordinations for enterprises subject to integration, clearly inadequate planning control for this process, an incomplete approach for developing it, the absence of a single normative document for controlling the production-economic activities of APF's, substantial shortcomings in price formation for agricultural raw materials and products obtained from the processing of these materials and so forth. The elimination of these unfavorable conditions will promote an acceleration in the process of agroindustrial integration.

Normal development of agroindustrial integration is possible if, assuming all other conditions are equal, the principle of developmental stages for it is observed. "Growth" up to the highest forms of agroindustrial integration (APP's, APO's) must take place through simpler forms. In many instances the development of secondary industrial activity at agricultural enterprises is the first and objectively necessary regular stage in agroindustrial integration.

The measures adopted by the CPSU in April 1966 and in subsequent years for developing secondary industrial production efforts at agricultural enterprises have produced fine results. It is apparent from Table 4 that over a period of 15 years 683,600 additional individuals (an official estimate) have been drawn into participating in secondary industrial operations at agricultural enterprises. The industrial-production fixed capital increased by a factor of 8 and the production of goods increased by 12.17 billion rubles worth. The average annual rates of growth for the principal indicators of secondary industrial activities at agricultural enterprises should be viewed as being rather high, especially at inter-farm organizations where they were higher by a factor of more than 2 than in kolkhoz industry (see Table 5).

Owing to excessive rates of growth in industrial-productive capital compared to the rates for increases in the industrial-production personnel strength, the capital-labor ratio in this sphere of activity increased systematically. The average annual rates for this increase during the 15 year period in the industry of sovkhozes amounted to 8.05 percent, inter-kolkhoz organizations -- 10.98 and kolkhozes -- 12.14 percent. The capital-labor ratio for a worker was highest in the industry of inter-kolkhoz organizations (10,600 rubles in 1980). Labor productivity also increased (see Table 6). The average annual rates for this

TABLE 4

Principal Data for Secondary Industrial Production Efforts at Kolkhozes (less fishing), Inter-kolkhoz Organizations and Sovkhozes of USSR Minsel'khoz During 1965-1980

Indicators	1965	1970	1975	1980
Official industrial-production personnel strength, in thousands of individuals	1011.0	1370.9	1498.3	1694.6
Industrial-productive fixed capital at end of year, in millions of rubles	1522.0	3547.5	7288.6	12239.6
Value of gross output in comparable prices, in millions of rubles	3680.0	7569.0	11553.0	15858.0

TABLE 5

Average Annual Rates of Growth in Principal Indicators (%) for Secondary Industrial Activities of USSR Agricultural Enterprises During 1965-1980

Indicators	Kolkhozes (less fishing)	Sovkhozes of USSR Minsel'khoz	Inter-kolkhoz Organizations	Average for Agricultural Enterprises
Official industrial-production personnel strength	1.78	3.48	7.30	3.50
Industrial-production fixed capital	13.48	13.03	18.85	14.91
Gross output	7.28	10.92	16.25	10.21

TABLE 6

Average Gross Output Production by One Official Worker in Industrial Production at USSR Agricultural Enterprises (rubles in comparable prices)

Years	Kolkhozes (less fishing)	Sovkhozes of USSR Minsel'khoz	Inter-kolkhoz Organizations
1965	3841	3841	2466
1970	5872	5769	4108
1975	7027	8969	6621
1980	8462	10902	8208

increase can also be considered as fine: over the 15 year period they amounted to 5.42 percent for the industry of kolkhozes, at sovkhozes -- 7.20 and at inter-kolkhoz organizations -- 8.34 percent.

The indicators for output-capital ratio are also rather high (see Table 7), although a trend towards a reduction in them is noted through the years. The latter is associated with an increase in the proportion of capital-intensive branches in the

structure of industry and some other conditions. Nevertheless the output-capital ratio for industrial subunits of agricultural enterprises is considerably higher than in a majority of the agricultural branches.

Thus, statistical data accumulated over a period of many years testifies to the high effectiveness of live and materialized labor invested in the development of secondary industrial activities at agricultural enterprises. In the process, it should be borne in mind that live labor is utilized here mainly during periods when it cannot be employed in agricultural production. The development of secondary industrial activities promotes a reduction not only in working time losses caused by seasonal labor but also in losses in products already grown and it also draws into economic use additional sources of local raw materials. During the period under review the country obtained from the industrial subunits large quantities of additional products which were badly needed for the national economy and for satisfying the requirements of the workers. This included food products (flour, groats, butter, canned goods, dried fruit, vegetables and potatoes, pickled, leavened and marinated vegetables, starch, wine, cheeses, sheep cheese and so forth) and feed for livestock (mixed feed, various feed additives, feed mixtures and so forth), construction materials (bricks, tiles, precast reinforced concrete structures and parts, non-metallic construction materials), various wood-working products, packaging goods, souvenirs, goods of a cultural-domestic and economic nature and so forth.

Computations were carried out in the Laboratory for Economic Studies of the TSKhA /Timiryazev Agricultural Academy/ on the effectiveness of introducing scientific recommendations for the development of secondary industrial activities at kolkhozes and sovkhozes of the USSR during the 1975-1980 period. The initial data (see Table 8) for the computation was drawn from annual reports.

The economic effect ($Э_э$) is computed using the formula:

$$Э_э = (П_о - E_н K_о) - (П_б - E_н K_б),$$

where $Э_э$ is the economic effect; $П_б$, $П_о$ -- the profit from the sale of industrial products during the base (1975) and reporting (1980) years; $K_б$, $K_о$ -- the capital investments in the industrial activities during the base and reporting years; $E_н$ -- the normative coefficient of effectiveness for the capital investments, equal to 0.12

Substituting appropriate data from Table 8 in the formula, we note that the economic effect for the 5 years equals 68,22 million rubles and the average annual effect -- 13.64 million rubles, that is, it is adequately high. There is sufficient basis for assuming that its actual value is roughly three times higher. The fact of the matter is that the computation was carried out only for products sold, while all capital investments were taken into consideration, including investments for the production of products consumed within the farm (roughly 60 percent of the overall volume of goods produced). In addition, the economic effectiveness of the processing of agricultural raw materials was not taken into consideration here.

The mass of profit realized from the sale of industrial products will not be dependent upon the caprices of weather and it will increase from year to year. The

TABLE 7

Output-Capital Ratio in Industrial Production at USSR Agricultural Enterprises (per ruble of average annual value of industrial-production fixed capital, for gross output obtained in comparable prices, in rubles)

Years	Kolkhozes (less fishing)	Sovkhozes of USSR Minsel'khoz	Inter-kolkhoz Organizations
1965	3.69	2.89	1.19
1970	2.87	2.60	1.14
1975	1.90	2.27	0.90
1980	1.46	1.95	0.77

TABLE 8

Capital Investments in Secondary Industrial Activities of Kolkhozes and Sovkhozes of USSR Minsel'khoz, Their Volume of Industrial Product Sales and the Profit From Such Sales (in thousands of rubles)

Years	Capital Investments*	Industrial Products Sold**	Complete Production Costs for Products sold	Profit From Sales
1975	576,425	1,209,198	921,775	287,423
1976	606,503	1,304,638	1,011,079	293,559
1977	664,534	1,406,115	1,102,434	303,681
1978	752,360	1,480,381	1,156,521	323,860
1979	676,507	1,671,201	1,323,698	347,503
1980	716,773	1,774,484	1,401,996	372,488

proportion of such profit compared to the overall volume of profit realized from the sale of products and services will also increase. In 1980, for example, it provided more than one half of all kolkhoz profits. The production profitability for industrial products sold at kolkhozes and sovkhozes, which can be easily computed using the data in Table 8, fluctuates from 26.3 to 31.2 percent from year to year. The principal bulk of the profits obtained from the sale of kolkhoz and sovkhoz industrial products is utilized for the intensification of the chief branches -- field crop husbandry and animal husbandry -- and in this manner an increase is actively promoted in the production of agricultural products.

An equally important aspect of secondary industrial activities at agricultural enterprises is the fact that its development in accessible form serves to acquaint the rural residents with industrial production and it provides them with the experience of plant workers, the technical culture and knowledge of the industrial means and methods for carrying out production operations. In other words, secondary industrial activities serve to draw the workers and leaders of agricultural enterprises into the process of agroindustrial integration. Hundreds

of farms are now following this path and they are being transformed into highly developed agroindustrial enterprises, the workers of which are successfully combining agricultural and industrial labor in carrying out their work. Although this is not the most rapid path, it is nevertheless certain and reliable. It does not require large-scale one-time capital investments by the state and for all practical purposes it is available to a much broader range of farms than other methods for converting them into agroindustrial enterprises.

Scientific studies and leading experience reveal that those agricultural enterprises which have been transformed into agroindustrial units based upon the developed of secondary industrial activities appear to be more stable and function in a reliable manner, thus ensuring high managerial results and rapid rates for economic and social development.

Considerable labor resources not involved in social production are still to be found in the rural areas, especially during the autumn and winter period. On a number of farms, where the possibility of developing secondary industrial activities is very feasible, very little effort is being made in this direction. Very little use is being made of the opportunities available for developing production cooperation with industrial enterprises. This is why the USSR food program for the period up to 1990, approved during the May (1982) Plenum of the CPSU Central Committee, contained the following task: "In the interest of ensuring year-round employment on the farms for kolkhoz members and sovkhoz workers, to develop secondary production efforts and trades where such development is possible and also production cooperation with industrial enterprises"*.

In order to carry out this task, a system of measures must be developed and implemented aimed at achieving further development at the kolkhozes and sovkhozes and at other agricultural enterprises for secondary industrial production efforts and trades (primarily in connection with the processing of agricultural raw materials and wild fruit, berries and mushrooms, the production of construction materials and consumer goods made chiefly from local raw materials and the waste products of industry) and also the development of production cooperation among kolkhozes, sovkhozes and other state agricultural enterprises, inter-farm enterprises and organizations lacking the conditions required for ensuring year-round employment for their own workers and industrial enterprises, associations and other trade and economic organizations.

When organizing industrial departments (sectors) at agricultural enterprises, in cooperation with industrial and other enterprises and organizations, workers should ideally be engaged for this work who were released from social production during inter-seasonal periods, the members of families and also those who are not working in social production although residing on the territory of farms, including pensioners, people with limited work capabilities and the members of families of workers and military personnel desiring to participate in social production.

In many instances a need arises for organizing work at home and also for making it possible to work less than a full day or less than a complete week in the industrial

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* Food program of the USSR for the period up to 1990 and measures for implementing it. Moscow, Politizdat, 1982, p 59.

department of a kolkhoz or sovkhoz. Obviously, during tense agricultural periods, the workers in the industrial departments must work out on the fields, thus reducing if not eliminating entirely the use of the municipal population for carrying out this work. In order to achieve more complete and efficient utilization of the able-bodied workers of industrial departments, in the carrying out of work during extremely tense periods and also for substituting for field crop and animal husbandry workers during their vacation periods or when ill, the industrial department workers should be provided with training in various specialties: machine operator, combine operator, motor vehicle drivers, operators, machine milking and other agricultural professions.

An analysis of the work of farms actively engaged in developing secondary industrial activities reveals a need for authorizing kolkhozes, sovkhozes and other state agricultural enterprises and inter-farm organizations to procure surplus fruit and vegetable products from the population and, on other farms, wild fruit, berries. mushrooms and other gifts of nature, for their subsequent technological processing. In addition, they should be extended credit so as to be able to pay for the mentioned procurements.

In connection with the further development of the industrial activities of sovkhozes, kolkhozes and inter-farm enterprises and organizations,,considerable importance is being attached to abolishing the turnover tax for industrial goods produced by them (with the exception of wine and consumer goods produced from plastics). The objective need for abolishing this tax has been substantiated in our publications.

The development of production cooperation among agricultural and industrial enterprises assumes the preparation and implementation of a number of measures which will ensure mutual advantages from such cooperation on a long-term contractual basis and which will clearly establish the rights and obligations of the cooperating parties,,their mutual relationships and so forth.

The experience already accumulated in this work reveals that the industrial and other enterprises and associations must participate in the construction of the facilities for the industrial departments (sectors), at the expense of the agricultural enterprises, carry out the installation and adjustment of mechanisms and equipment and their technical servicing, turn over to the agricultural enterprises in the established manner the mechanisms, equipment, applieances and instruments required for the production of consumer and production-technical goods, semi-finished goods, component units and parts, packaging materials and other items and supply the raw materials and other materials in conformity with the contracts concluded and the consumption norms. At the expense of the agricultural enterprises, the industrial enterprises train personnel for work in the industrial departments (sectors), through individual or group instruction in the various areas or at the enterprise proper. For its part, the agricultural enterprise makes personnel available for work in the industrial department, it organizes the production process and it delivers the products produced from the raw materials and other materials made available by the industrial enterprise to this enterprise, in conformity with the quantities, schedules and prices stipulated in the contract.

The development of production cooperation raises the need for adding to the tables of organization of agricultural enterprises having departments organized on the

basis of cooperation with industrial enterprises, the positions of masters and senior masters, depending upon the output production volumes and guided by the norms established for the respective branches of industry.

Many questions arise in connection with the setting of norms and wages. It is obvious that the output norms for workers in secondary industrial departments of agricultural enterprises, created on the basis of production cooperation with industrial enterprises, must be determined in conformity with the norms in effect at these enterprises and taking into account the specific production conditions, while the wages and bonuses for workers in the mentioned departments are carried out in accordance with the wage rates and based upon the conditions established for similar types of work and corresponding categories of workers at industrial enterprises. The wages and bonuses for leading workers and specialists attached to secondary industrial industrial production efforts at agricultural enterprises, created on the basis of cooperation, should also ideally be carried out in accordance with the official salaries and conditions established for similar workers at industrial enterprises and associations participating in the production cooperation. This same principle of similarity must serve as a guide when determining the number of leading workers and specialists in the industrial departments of kolkhozes and sovkhozes and establishing these numbers in accordance with the official norms for the respective branches of industry.

There are many problems for which the planning and supply organs are awaiting solutions. Here we have in mind the production and deliveries of machines and equipment (for the processing of fruit and vegetables and for the production of bricks and other construction materials) of low and medium capability, suitable for effective utilization in the secondary production operations of kolkhozes and sovkhozes; the allocation and deliveries of paint and varnish materials, citric and acetic acids, beads, mother-of-pearl, brass waste products, polystyrene, polyethylene, textiles and other auxiliary materials, raw materials and equipment required for the production of consumer goods.

Solutions must be found for equally complicated problems associated with completing the formation of a system for administering the industrial activities of agricultural enterprises at the rayon, oblast and republic levels. The decisions handed down during the May (1982) Plenum of the CPSU Central Committee called for the creation of rayon, oblast (kray) and republic (ASSR) agroindustrial associations. Their activities must be directed towards ensuring proportional and balanced development for all branches of the agroindustrial complex, raising the efficiency of production operations, achieving constant improvements in the administrative mechanism and inter-branch production-economic relationships, creating stable economic conditions for the cost accounting activity of each labor collective, raising the responsibility of leaders for the profitable management of production operations, improving the branch and territorial structure of the agroindustrial complex, developing production specialization and concentration so as to ensure the efficient utilization of labor resources, land and other production resources and so forth. Based upon the rights and obligations of territorial agroindustrial associations, as established in the decisions handed down during the May (1982) Plenum of the CPSU Central Committee, the responsibility of these associations for directing the development and activities of secondary

industrial production efforts and trades in agriculture should ideally be pointed out in the standard statutes governing these associations.

The implementation of the decisions handed down during the May (1982) Plenum of the CPSU Central Committee will undoubtedly serve as a new and powerful stimulus for the further development of agroindustrial integration -- an important means for solving a number of basic problems concerned with the construction of communism.

7026
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COMMENTARY, ADVICE OFFERED ON PRIVATE PLOT PROBLEMS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Sep 82 p 3

[Article: "The Private Plots--A Matter of General Concern"]

[Text] In connection with the food program, a great amount of attention is being given to the further development of private plots and orchard and gardening cooperative farms. Following the publication of the article entitled "Around Six Hundredths of a Hectare" (see the 29 June 1982 issue of the newspaper), the editorial board has continued to receive letters from our readers touching upon the various problems of the private plots. In this article these letters are examined and commented upon by a head of a sector at the Institute of Economics of the World Socialist System of the USSR Academy of Sciences and Doctor of Economic Sciences G. Shmelev and by the editor of SOTSIALISTICHESKAYA INDUSTRIYA for the Department of Economics and Propaganda Yu. Chaplygin.

During the May Plenum of the CPSU Central Committee, it was noted that the private plots make a considerable contribution towards the production of food goods. According to some estimates, this contribution exceeds one fourth of the gross agricultural output. An engineer in Leningrad, I. Kovalev, has requested a specific evaluation of the contribution made by these plots in supplying the population with food goods.

Allow me to cite several figures. At the present time, the private plots furnish approximately one third of the gross production of meat, milk, eggs and vegetables, one half of the fruit and berries and almost two thirds of the potatoes. It would seem that these proportions are considerable. But I would like to state first of all that I have cited those products in which the private plots are making the greatest contributions. Secondly, the private plots are for the most part satisfying the requirements of their owners, that is, considerably fewer products are being made available for sale than are being produced on the plots. Let us take marketable products. The kolkhozes and sovkhozes furnish 86 percent of the marketable meat and the private plots--only 14 percent. The public farms produce 94 percent of the eggs and milk being sold to the population, more than one half of the potatoes and 85 percent of the vegetables.

Some of our readers compare the volumes of products produced on the private plots against the land areas at their disposal and draw a conclusion regarding their high effectiveness. Is this true?

Actually, the kolkhoz members and manual and office workers have very little land available for their private use--approximately 8 million hectares, including 6 million hectares of arable land. Orchards and vineyards occupy almost 2 million hectares. If we compare these figures against the gross production, then it would appear that the private plots are quite effective. But this effectiveness is the result of tense manual labor. This factor must be taken into account.

In discussing the effectiveness of the private plots, we must obviously take into account the assistance they receive from the public sector. True, the readers write in stating that they are not receiving any assistance. For example, an amateur horticulturist in Belgorod, A. Belyayev, stated rather indignantly: "We are unable to obtain even the simplest of implements. Our land and orchards are worked in the absence of agronomical and chemical supervision."

The organization of assistance for the private plots and orchard and gardening cooperatives is fraught with many shortcomings. But measures are being undertaken. On two occasions, in 1977 and again in 1981, the CPSU Central Committee and the USSR Council of Ministers examined the problem of developing these farms. In the decisions handed down during the May Plenum of the CPSU Central Committee and in the food program, the plans called for greater importance to be attached to the private plots for solving the food program. And fine experience in providing them with effective assistance has been accumulated in a number of oblasts and union republics, experience which has made it possible within a brief interval of time to increase the production of products. At the present time, the kolkhozes and sovkhozes are annually selling and issuing to the owners of private plots approximately 9 million tons of grain and 7 million tons of coarse feed. During 1980 alone, they sold or transferred over to them for fattening purposes approximately 15 million young pigs, almost 1 million head of young large-horned cattle stock and 570 million chicks. Assistance is also being furnished for tilling the land and for applying chemical plant protective agents and mineral fertilizers.

However, there are those among our readers who refer to these plots as being "private" and as such they feel that they cause harm to our society. A. Kosarev in Podolsk posed the question in the following manner: "Is it really necessary to develop private plots? Does this not encourage private ownership tendencies which could divert the people away from public production?"

By no means can the private plots be considered as truly "private" in nature. It just cannot be. Nor are they distinguisehd from being "private" only because the land belongs to the state. The plots are managed by kolkhoz members, manual and office workers or pensioners. And work is carried out on these plots not instead of on public farms but in addition to work on the latter farms, with use being made of an individual's free time.

Just who are these owners of private plots?

Roughly 12.6 million of them are kolkhoz members, almost 11 million are manual or office workers of state agricultural enterprises and approximately 9 million are municipal workers and employees. If we assume that each family consists of an average of four individuals and that 9 million families are engaged in collective horticulture and gardening, then we are talking about almost 168 million Soviet people. Indeed, can all of these be petty private traders? What can be said regarding a lathe operator who occupies two posts--during the day he works at a plant and in the evening he works on his own garden as a private owner?

The social aspect of a rural or municipal worker who operates a private plot is singular and indivisible. It is defined by the social character of socialist production and by the national form of ownership of the means of production. By developing private plots, we are not reviving private ownership, nor are we waiving the principles of socialism. Rather, we are utilizing the internal reserves of families, their attraction to the land and their material interest in solving such a complicated problem as the food problem.

Nevertheless the private plots are sometimes used, as stated by I. Gladkov from Novorossiysk in his letter, "for the making of profit by enterprising smart dealers and such connivance causes moral and material harm to society." And our teacher in Voroshilovgrad, T. Ivanitskaya, draws attention to the dual nature of private plots. "On the one hand they appear to assist the state in solving the food problem, but on the other hand these orchard and garden plots serve as a means for enriching their owners." What is your opinion in this regard?

Unfortunately, money-grabbers are to be found among the owners of private plots just as they are to be found among those who do not operate such plots. But in any case these individuals are not typical of the overall mass of private plot owners. In addition to such mercenary incidents, I could also cite many examples of unselfish work by the owners of such plots.

By no means should negative facts be used for drawing conclusions regarding an adverse role played by private plots on the whole. Obviously, not everybody is capable of understanding the true economic role and social essence of these plots and thus instead of proposals for eliminating the deformations we have proposals for eliminating the plots themselves. Strange logic! We must not forget a chief concern: the private plots represent a large source for obtaining food goods.

It should be borne in mind that the dimensions of the private plots are not unlimited. For example, sovkhoz workers in the RSFSR cannot be allocated more than 30 hundredths of a hectare of land and the residents of cities for orchards and gardens--no more than 6 hundredths of a hectare.

But one hears proposals concerning limiting the sphere of activity of private plots in horticulture and gardening. And one of our readers in Kharkov, D. Filimonenko, believes that the livestock on private plots should be turned over to the public farms.

We are not in agreement with such proposals. At the present time, roughly one fourth of all livestock are being maintained on the private plots. In view of the present deficit in labor resources, where could the manpower be obtained for servicing such numbers of livestock? In view of the modern level of mechanization on the farms, the requirement for such manpower would be considerable and the livestock and poultry in the present yards are as a rule maintained by the second members of families--housewives and pensioners. But let us assume that we found the manpower. Considerable monetary funds would be required for paying the new workers and financial and material resources would also be needed for the construction of livestock facilities and their equipment. And all of this would be required not for the purpose of increasing the production of goods, but rather merely for the purpose of transferring the livestock over from the private plots to the public farms. Let us assume that such a transfer was carried out. This would also involve the transfer of large sources for satisfying the food requirements of the rural population--from their own plots to municipal and rural stores.

Our mail also contains letters in which readers have proposed that the owners of private plots be forbidden to produce more products than they can consume themselves and that legislation obligate them to sell their surplus products through consumer cooperation.

I view such proposals as being unrealistic. It bears mentioning that they are not new and that they were advanced even during the development of the Constitution of the USSR. Why are these proposals unacceptable? For two reasons.

First of all, the products of the private plots produced as a result of the personal labor of the owners of these plots are considered to be their private property. They pay a tax for the use of the land and thereafter they are entitled to do anything they choose with the products: to either consume them or sell them and if they choose to sell the products--in the most suitable and advantageous manner.

Secondly, it is a blessing rather than a misfortune for surplus products to be produced on these plots. Unfortunately, over the past 10 years a trend has been observed on the private plots towards a reduction in the production of almost all of the principal types of products with the exception of grapes, fruit and berries. Nevertheless, it is still difficult work--carried out during one's free time and involving an exceptional amount of manual labor. Nor are the best of attitudes displayed in the raising of livestock, poultry or vegetables or in rushing them off the markets.

The owners of private plots and orchard and gardening farms themselves strive to sell their products at the markets. Moreover, the prices they ask for their products are by no means the best.

This is not always so. The prices at municipal markets are based upon the supply and demand for a particular product and also upon how abundantly it is made available to the state and cooperative trade. The possibilities for consumer cooperation procuring products from the population, although they have increased in recent years, nevertheless are still inadequate for collecting,

protecting and delivering to the processing enterprises and consumers everything produced on the private plots. Thus the appearance of their owners at municipal markets is often forced--they do not have a selection of forms for sale of surplus products.

It is obvious that the market trade will for an extended period of time continue to supplement the state and cooperative trade. And it is by no means an accident that in connection with the food program and in addition to developing the trade-procurement activities of consumer cooperation, discussions are taking place on expanding the network of kolkhoz markets and strengthening their logistical base.

And here is what V. Biryulina in Penza had to say in her letter: "The market is profitable to those who sell vegetables and fruit using vehicles, whereas we gardeners can only sell 2-3 kilograms of cucumbers at a time. How can we organize the marketing of our crops such that it will be profitable and convenient for us and at the same time not unprofitable for our consumers?"

It bears mentioning that such experience is available in Penza. There, within the system of consumer cooperation, a large cost accounting trade-procurement association has been organized. It purchases the surplus products of horticultural societies through its own points organized on their territories. It should be noted that following the creation of this trade-procurement association the market prices in Penza were established at levels which were 10-15 percent lower than those at kolkhoz markets in cities in neighboring oblasts.

The trade services bureaus at municipal markets could provide the horticulturists and gardeners with a great amount of assistance. There are already approximately 800 of them and yet they concern themselves only with the meat trade. Why do they not expand their sphere of activity? There would be advantages for all--for both the sellers and the purchasers.

An interesting experiment is being carried out in Rostov-na-Donu. Here the stores of gorkooptorg [city cooperative trade organization] and the cost accounting organizations of oblkooptorg [oblast cooperative trade organization] are required to accept the orchard and gardening products of Rostov residents with no restrictions. The payments for the products are made directly in the stores. And two rayon procurement offices organized receiving points directly on the territories of horticultural cooperatives. The plans also call for organizing a traveling circuit for the purpose of procuring products on the spot. The standard vegetables and fruit are purchased at prices called for in the contract. Non-standard products are accepted at prices which are 50 percent lower than the procurement prices--for industrial processing. The private plots at Omsk and Lvov have converted over or are in the process of converting over to roughly this same system for procuring products.

In completing our discussion, I wish to emphasize the following: the private plots exist and are being developed within the framework of the economic system of socialism and our state has adequate means for suppressing all possible deformations of them. At the same time, it should be borne in mind that although these plots are private in nature, the need for strengthening them is a matter of general concern.

7026
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TILLING AND CROPPING TECHNOLOGY

MEASURES FOR COUNTERACTING EFFECTS OF DROUGHT CONDITIONS ON KAZAKHSTAN HARVEST

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 8, Aug 82 pp 14-15

[Article by E. Gossen, Candidate of Agricultural Sciences and deputy director for science at the All-Union Scientific Research Institute of the Grain Economy, Tselinograd Oblast: "To Reduce the Effects of Drought Conditions On a Harvest"]

[Text] Grain production on the order of 25-27 million tons and the sale of billions of poods of grain to the state have stabilized in Kazakhstan with the introduction of the soil-protective technology for cultivating grain crops.

However, periodically reoccurring droughts (2-3 years out of every 5) result in considerable fluctuations in the gross yields of grain. One of the chief tasks of the republic's farmers is that of overcoming these unfavorable natural factors. And the achievements of science and production experience are making it possible to reduce substantially the adverse effects of droughts.

The comparatively brief frost-free period (100 days), the May-June drought, the July maximum in precipitation and the extensive spread of wild oats--all of these factors call for late sowing periods for cereal grain crops in the northern oblasts of Kazakhstan.

Strong wind is a constant natural factor in Kazakhstan and western Siberia. However, it plays a positive role when stubble is left on the soil's surface, forming snow deposits and warming the soil in winter and dampening it in the spring. The moisture supplies accumulated as a result of winter precipitation (40 percent of the annual norm) in the one and a half meter layer of soil are equivalent to moisture-supply irrigation and this makes it possible for spring wheat plants, even in the case of the primary root system, for the effects of a May-June drought to be postponed and for effective use to be made of a maximum amount of precipitation.

Thus, in the western Siberian ecological region, which includes the eastern regions of the southern Urals, the western and northern oblasts of Kazakhstan, the southern regions in Omsk Oblast and the western regions of the Altay Kray, where the grain of strong varieties of spring wheat ripen, the sweep tilling of soil carries out two tasks--it protects soils against wind erosion and it alleviates considerably the pernacious effects of a drought. Thus the area which undergoes sweep tilling in Kazakhstan has already been increased to 20 million hectares.

In northern Kazakhstan, based upon data accumulated over a period of many years, the highest grain production per hectare of crop rotation area is furnished by 4-field, 5-field and 6-field grain-fallow crop rotation plans, in which one field is occupied by clean fallow, 1-2 fields--by forage crops and the remaining fields are occupied by spring wheat. A hectare of clean fallow for grain crops is essentially equivalent to a hectare of irrigated land on which water supply irrigation has been carried out. Thus the advantage rests with the fallow, since the physical condition of its soil is better and the amount of nutrients accessible to the plants is higher than that under irrigation conditions.

Clean fallow is of invaluable importance in terms of its extended and positive residual effect for combating both droughts and weeds. The norms for increases in grain crop yields from the use of clean fallow are the highest for all regions of the country.

In view of the tremendous importance attached to clean fallow for the country's most important grain regions, where droughts are not a random occurrence but rather a basic feature of the climate, a field of clean fallow must be viewed as being sacred and inviolable and no circumstances can justify a disruption in this mandatory requirement for steppe farming.

The effects of a drought are aggravated by growth in the weediness of fields caused by wild oats, which do not germinate during cold and prolonged spring periods and thus, in addition to agrotechnical measures, require chemical agents and particularly soil herbicides of the Triallat type, synthesized at the Kaustik Combine in Sterlitamak.

The use of phosphorus fertilizers on a fallow field and during local sowing in drill rows furnishes not only a substantial increase in yield but in addition it also promotes an acceleration in the ripening of spring wheat.

Finally, the more drought resistant varieties of Saratov and Kazakhstan bred spring wheat also promote a softening of the pernicious effects of a drought.

Thus, farming experience throughout the republic reveals that the introduction of all elements of a soil-protective system of farming (grain-fallow crop rotation plans, sweep tilling, the use of herbicides, fertilizer applications and sowing seed for new varieties) is a principal measure for combating droughts.

At the same time, taking into account the extreme conditions of 1981, which were characterized by excessively dry weather during the latter half of the summer and in the autumn, a need has arisen for additional agrotechnical and organizational measures aimed at accumulating and retaining moisture and also for carrying out field work rapidly and during the best periods.

An example is provided below of a technological system for obtaining planned cereal grain crop yields for the moderately dry steppe region of northern Kazakhstan. Similar technical systems for the cultivation of agricultural crops should be developed for each soil-climate sub-zone and experimental stations should play a chief role in defining more precisely these technologies.

Crop rotation plan. 1st field--strip fallow, 2d--wheat, 3d--wheat, 4th--barley (wheat) and 5th field--wheat.

Fallow. Clean, sweep tilling to a depth of 12 cm, windbreak strip. Tilling in the autumn using a KPSh-9 and in the spring a BIG-3 unit to a depth of 5 cm. In the summer, as aftergrowth appears in the weeds--cultivation using KPSh-9's to a depth of 12-14 cm. During the first 5 days in July--sowing double row strips (mustard, grain) every 8-12 meters. Tilling carried out using BIG-3 units for the purpose of covering over the wild oats seed and leveling off the land in the autumn.

Fertilizer applications. The second or third tilling of the clean fallow must be carried out with a simultaneous application of granulated superphosphate in a dosage of 80 kg per hectare, to a depth of 12-14 cm using a KPG-2.2 unit. In the absence of a KPG-2.2 unit, phosphorus fertilizers can be applied using written off SZS-2.1 units and to the same depth. If fertilizer was not applied to the fallow, then during the sowing of the second and subsequent crops following the clean fallow one should apply superphosphate, ammophos, nitrophos or nitroammophos to the drill rows in a dosage of 10-20 kg per hectare.

Autumn cultivation. Sweep tilling using KPSh-9 units to a depth of 12-14 cm. On fields contaminated with wild oats, use should necessarily be made of BIG-3 units prior to and following the principal cultivation. During a dry autumn when the supplies of productive moisture in the 0-30 layer are less than 30 mm and the fields are only weakly contaminated by weeds, autumn cultivation is not carried out or it is limited to tilling with BIG-3 units. A surface application of granulated Triallat at the rate of 15 kg of the preparation per hectare.

Snow retention. This is carried out using SVU-2.6 snow plows in two tracks every 4-5 meters.

Tending of crops. Spraying of the grain crops during the tillering phase using 2.4-D herbicides for combating dicotyledonous weeds. Amine salt 2.4-D is used in a dosage of 0.8-1.0 kg per hectare and ethers--0.3-0.5 kg per hectare. Suffix (Karakhol) is employed against wild oats on wheat plantings in a dosage of 7.5 liters per hectare, also during the tillering phase for the wheat.

Harvesting and post-harvesting processing of grain. Two-stage. Mowing into windrows from the middle to the end of the period of waxy ripeness, at a grain moisture content of 35-25 percent. The duration of the threshing of the windows is 5-7 days. The ZhF-2-12 harvester with the ES-1 power unit appears to be very promising. Processing of the grain at a Tselinnyy drying-cleaning complex (Ts-30 dryer and two coupled ZAV-40 units).

An inspection of this technology at an experimental farm of VNIIZKh [All-Union Scientific-Research Institute of Grain Farming] and at the Stepnoishimskaya Experimental Station revealed it to be highly effective. The cropping power for grain crops at an experimental station (Kokchetav Oblast) during the 10th Five-Year Plan was 19.3 quintals and during the dry year of 1981--20.7 quintals per hectare. At VNIIZKh (Tselinograd Oblast), under conditions involving unprecedented drought conditions during the second half of the summer (complete

absence of the July and August precipiation maximums), the cereal grain crop yield for an area of 26,000 hectares was 14.8 quintals and during the 10th Five-Year Plan--approximately 19 quintals. The brigade of Hero of Socialist Labor S.I. Gavrilyuk raised its cropping power to 20 quintals per hectare. Similar data has been recorded in many other regions of Kazakhstan.

It bears mentioning that the extended use of sweep tilling (more than 10 years) has increased the humus content in the 0-10 cm layer by 0.3 percent and this is improving the physical properties of the soil.

A number of additional measures should be undertaken in 1982 and 1983 in order to counter the pernicious effects and residual action of droughts. In the interest of accumulating and retaining moisture in the soil, snow retention work should be carried out depending upon the depth of the snow cover, in 1-2 tracks using SVU-2.6 tractor snowplows, with rows of snow being established every 5 meters. Early in the spring (when it is possible to move out onto the fields), the lumpy surface of arable land should be worked using BIG-3 harrows and shallow plows with flat disks and packing should be carried out using ring-lug rollers.

In the case of fields which were leveled off in the autumn (without lumps), it is best if they are not dried out by means of tillings prior to the optimum period (12-15-25 May) for the carrying out of pre-sowing cultivation.

All of the spring work should be carried out using the large-group method, with special attention being given to the quality of the pre-sowing cultivation (destruction of wild oats), differentiation of the sowing norms for the various types of regionalized varieties and the depth of seed placement, taking into account the drying out of the upper soil layer. More extensive use should be made of the SZS-2.1 sowing units.

Maneuvering should be carried out taking into account the weather conditions: the sowing periods (taking into account the moisture conditions and the wild oats); the sowing norms (for drought conditions--lower limit of the sowing norm); group of crops (wheat, oats, barley); local application of fertilizer to the drill rows, especially for later sowing periods, in order to avoid delayed ripening; to make full preparations for a more complicated harvest (possible second growth), especially the drying and cleaning economy, spare parts for the harvesters and combines.

Organizational measures for feed production, including under irrigation conditions:

...on estuary and irrigated lands, to apply a top dressing of nitrogen to the perennial grasses (30-60 kg per hectare);

...to carry out the first cutting prior to the July precipitation maximum, in order to obtain a second cutting as a result of summer rainfall;

...old grasses should be plowed up in the early spring and sown in annual grasses for the summer rainfall;

...if the summer rainfall is late in arriving, late ripening rape should be sown extensively for green feed, silage and haylage and this will require the creation of supplies of rape seed;

...all of the conditions required for obtaining two yields annually from the sowing of oats following oats, millet and barley must be created. Secondary sowings must be carried out using SZS-2.1 sowing machines, which combine pre-sowing cultivation, sowing, the application of granulated fertilizers and packing during one pass by a unit, thus making it possible to reduce the cultivation and sowing work by 5-8 days;

...to apply fertilizers, herbicides and other toxic chemicals using only ground machines;

...when preparing equipment and training the cadres of machine operators, thought should be given to having the grain crop harvesting work coincide with the procurement of coarse and succulent feeds;

...importance is attached to thoroughly preparing the fallow fields in behalf of the 1983 harvest.

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TILLING AND CROPPING TECHNOLOGY

INTRODUCTION OF NEW GRAIN VARIETIES IN KAZAKHSTAN

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 8, Aug 82 p 20

[Article by N. Plotnikov, chief of the inspectorate for the State Committee for the Strain Testing of Agricultural Crops in the Kazakh SSR of the USSR Ministry of Agriculture and candidate of agricultural sciences and inspector-agronomists G. Orlovskaya and I. Prikazchikova: "An Important Reserve for Raising Cropping Power"]

[Text] A chief concern today and even more so tomorrow, as noted by Comrade L.I. Brezhnev in his report delivered before the May (1982) Plenum of the CPSU Central Committee, is that of raising the cropping power of the crops. This underscores the need for placing greater emphasis on plant breeding and seed production. In addition, it requires the introduction of a scientifically sound system of farming, one which fully takes into account the natural-economic conditions of each zone, oblast, rayon and farm.

The grain growers of Kazakhstan have accomplished a great deal in this regard: the task of raising the average annual production of grain to 25-27 million tons during the past 5-year plan was successfully fulfilled. During the first year of the 11th Five-Year Plan, notwithstanding a number of serious difficulties, the republic's farmers supplied the homeland with more than 960 million poods of grain. Kazakhstan is quite properly considered to be a large producer of bread grain and the principal supplier of strong and durum wheat. The decisions handed down during the 26th CPSU Congress and also the 15th Congress of the Communist Party of Kazakhstan called for the republic's gross grain yield to be raised to 28-29 million tons during the 11th Five-Year Plan. This will undoubtedly require the mobilization of new reserves. One important factor for increasing the production of grain is that of introducing new regionalized and more productive varieties, which will make it possible to increase the cropping power considerably with no additional expenditures. For example, the Saratovskaya 42 spring wheat variety, which was regionalized during the years of the 10th Five-Year Plan, was grown on an area of 489,500 hectares in 1981, or 46.6 percent of the entire area sown in this crop. Compared to the Saratovskaya 29 variety, it produced an increase in yield of 1.3 quintals per hectare. The Nakat durum wheat variety, which was regionalized in 1978, was also introduced into operations here. This variety has made it possible over the past few years to fulfill the task for procuring durum wheats in a stable manner and to obtain additional monetary payments.

Many examples could be cited showing how the introduction of new varieties enabled many farm, rayons and even oblasts to obtain considerable increases in grain production. For example, in 1981 the new Omskaya 9 spring wheat variety, grown in Kokchetav Oblast on an area of 392,500 hectares, made it possible to increase the yield by 1.5-5.6 quintals per hectare above that for the regionalized Saratovskaya 29 variety. The new regionalized Ural'skoye 109 millet variety, in Zones II and III of Ural'sk Oblast, furnished an average of 9.2 quintals for an area of 2,322 hectares, while the Saratovskaya 843 variety produced an average of only 4.7 quintals per hectare for an area of 27,000 hectares. As a result, the farms in these zones sustained a shortfall of more than 12,000 tons of this valuable groat crop.

Interesting results were obtained in 1981 on farms in Tselinograd Oblast, where the new regionalized Tselinnaya 21 spring wheat variety revealed its considerable advantages in terms of cropping power. For example, at the Zavety Il'icha Kolkhoz in Makinskiy Rayon, a yield of 14.2 quintals of grain per hectare was obtained from 300 hectares, while Saratovskaya 29 produced 5.5 quintals less per hectare from an area of 6,200 hectares. At the Sovkhoz imeni M. Gor'kiy, the Donetskiy 8 barley variety produced 15.4 quintals per hectare from an area of 1,200 hectares, while the earlier regionalized Omskiy 13709 variety provided only 13.5 quintals per hectare from an area of 4,800 hectares.

Many such examples can be cited. They underscore the great potential afforded by new varieties for supplying the country with millions of additional tons of high quality grain in the absence of additional expenditures. Thus their rapid introduction into production operations is one of the chief tasks of the republic's farmers, since it is precisely these varieties which will be called upon to raise the grain production level already achieved in the republic during this current 5-year period.

It is known that the rapid introduction of a new variety into production operations is dependent upon the availability of seed. The republic's strain testing specialists are carrying out a tremendous amount of work in connection with the rapid propagation of such seed and each year they are growing on their fields and turning over to the base farms considerable quantities of seed for the more promising varieties. In 1981 alone, from an area of 7,400 hectares, the base farms were supplied with 51,400 quintals of wheat seed. Of this amount, 22,800 quintals or 44.4 percent were for deficit and promising varieties of wheat and more than 2,000 quintals--for durum wheat grain of the Almaz, Altayka, Nakat and Bezenchukskaya 139 varieties.

Meanwhile, the introduction of new varieties leaves much to be desired on many farms throughout the republic. Thus, according to data supplied by the Kazakh SSR CSA, 89 new varieties for various agricultural crops which were regionalized during the past 5-year plan have not achieved the levels planned. For example, by the end of the 10th Five-Year Plan, new varieties of winter wheat were being grown on only 200,000 hectares, or 16.2 percent of the overall crop area, spring wheat--1.61 million hectares of 10.5 percent. Of these figures, Kazakhstan bred varieties were being grown on 608,600 hectares, or 44.6 percent of the area being employed for new varieties. The areas being used for the highly productive Tselinnyy 5 barley variety in East Kazakhstan, Turgay and North Kazakhstan Oblasts are increasing in size in an unjustifiably slow manner. The sowings of

the Volzhskoye 3 millet variety in East Kazakhstan, Semipalatinsk, Turgay and Tselinograd Oblasts are also being expanded very slowly. At the same time, just as in the past, many farms are cultivating non-regionalized varieties on their arable land. In particular, such sowings were considerable in 1981 on farms in Semipalatinsk, Taldy-Kurgan, Pavlodar and Turgay Oblasts.

All of these shortcomings in the use of highly productive grain crop varieties must be taken into account and corrected in the near future. The decisions handed down during the May (1982) Plenum of the CPSU Central Committee require that this work be carried out by the farmers.

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