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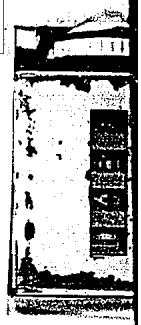

MECHANIZATION OF CZECHOSLOVAK AGRICULTURE

[Comment: This report summarizes an article by Jiri Matousek, from the No 5, 25 June 1955 issue of Planovane Hospodarstvi (Planned Economy) published by the Czechoslovak State Planning Office in Prague.]

Since only 31 percent of Czechoslovakia's population is now engaged in agriculture and the age structure of the agricultural population is unfavorable, the mechanization of all agricultural sectors becomes all the more important. The worker class must provide the necessary agricultural machinery and equipment. This machinery and equipment must be fully utilized, and maximum utilization can be achieved only under large-scale socialist agricultural operations.

Successes and failures in the utilization of machinery are often attributed to natural conditions and the local attitude of JZD (unified agricultural cooperative) members, farmers, and personnel in the field of agricultural mechanization. Such ideas lead to underestimating the political and economic importance of mechanization. They cause difficulties for the national economy because they create doubts as to the wisdom of investing in machinery and equipment not urgently needed while rejecting the demands of other productive sectors that need additional machinery and equipment and are effectively utilizing the machinery they have.

Present conditions in Czechoslovak agriculture are favorable to the utilization of agricultural machinery. In view of the great investment which the state makes annually in the improvement and development of machinery, it is imperative that this machinery be properly utilized.

In many MTS during the important spring months wheeled tractors are 80 percent utilized; potato planters, 36 percent; harvest machinery, 45 percent; and mowers (zaci listy), 50 percent. Tractors average 1.03 shifts and crawler tractors, 1.08 shifts. Tractors perform 82 percent of the stubble plowing and 85 percent of the deep plowing which extends into the spring months.

As a result of the irregular utilization of machinery there are great variations in the average performances of individual tractor units. If the national average were given an index of 100, those MTS with efficient economic organization would have a performance index of 200 or more.

In recent years the level of mechanization has been substantially raised. In grain-crop production, which occupies the major portion of the nation's arable soil, the preparation of the soil and particularly the harvest work have been mechanized. The gathering of straw from combines and the cleaning, drying, and transporting of grain have not yet been completely mechanized. Grain harvest is the most highly mechanized of all harvests; in some JZDs it has been 90 percent mechanized. An even higher level has been achieved in barley and wheat harvesting. Mechanization of the corn harvest is lagging.

The mechanization of industrial-crop production is seriously lagging. The disproportions in between-row cultivation have been eliminated, but the problems of thinning, weeding, and harvesting sugar beets have not been solved although conditions exist for mechanization of such tasks.

Mechanization personnel must devote their attention to the development of new machines for the cultivation of potatoes and vegetables, and to the utilization of existing machinery. Rough estimates indicate that potato planting

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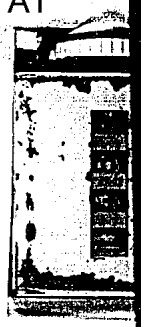

last year was 40 percent mechanized. The MTS had every means of completing the basic between-row cultivation of potatoes, but it was impossible to mechanize potato digging satisfactorily without making adaptations on existing diggers.

Despite the substantial increase in mechanized cultivation of fodder crops, the necessary universality has not been achieved. The cutting of fodder crops and mowing of meadows has been substantially mechanized but virtually no mechanization has been achieved in the drying and hauling of straw. In 1954, MTS cut a 68 percent greater area in fodder crops than in 1953, but contributed hardly at all to any other tasks related to the fodder harvest. Green fodder for feeding is still harvested in the old way, and in the preparation of ensilage the only task mechanized to any extent is the filling of the silos, in which the fodder is blown from the choppers into the silos. Only by using machinery to raise corn can corn be harvested in a milky wax stage.

Electric milking machines are used for 48 percent of the cows in JZD herds, while the transportation of feed and manure in these JZDs has been mechanized 17 percent. New barns on state farms are being substantially mechanized.

In special branches of agriculture such as hop production and fruit farming, successes have been achieved in the mechanization of cultivation and in the use of preventive measures [insecticides and fungicides].

Despite the great successes which have been achieved since the Two-Year Plan and the beginning of the First Five-Year Plan, the mechanization of the production of a number of crops and of livestock has not become adequately universal and thus has not had any great effect on productivity or on physical exertion in agricultural work.

In future years, the tempo of mechanization of agriculture must be increased, and the lag in the mechanization of some types and even some entire branches of agriculture must be overcome. The following machinery must be popularized:

1. Tractors which are very economical and adaptable for individual types of work and to local production conditions.

2. Highly efficient combines which can simultaneously perform a number of tasks. In addition to grain combines, beet, potato, flax, corn, silage, hop, and other types of combines should be developed.

3. Tractor-mounted machines for all types of soil preparation, particularly for cultivating industrial crops, vegetables, and orchards, and for loading and unloading crops. Hydraulic mechanism must be employed not only in setting up the machinery for work or transport, but also for regulation of equipment in operation.

4. Tractor-drawn machinery permitting a maximum number of tasks to be mechanized through use of movable aggregates equipped with highly efficient controls.

5. Means of transportation which will permit the mechanization of most of the work in barns, storehouses, and feed preparation buildings and on agricultural building projects and of soil melioration work and other tasks.

6. Additional electric motors and equipment which will permit safe and economical mechanization of tasks on or off the farm.

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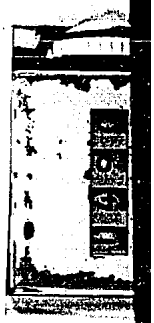

Such mechanization of agriculture can help overcome localized manpower shortages in a relatively short time, and physical exertion in agricultural work can be eliminated. Deficiencies in the introduction and utilization of existing machinery must be eliminated, and the experiences of the USSR must be emphasized.

The mechanization of agricultural transportation is a very important problem. Ways must be found to harmoniously use automobiles [trucks], transport tractors, and draft animals. All of these transportation methods must be considered as an indivisible total, particularly because their maximum utilization is possible only under certain conditions. For example, the utilization of the payload capacity (lozna plocha) of trucks increases significantly as the hauling distance increases. In hauls of up to 5 kilometers, 10 percent of the payload capacity is usually utilized; whereas in hauls of up to 15 kilometers, this capacity is utilized 88 percent. In the case of transport tractors the utilization of the payload capacity is less dependent upon the hauling distance, particularly because in the cooperative economy tractor transportation accounts for 40 percent of all transportation by means other than trucks. Even so it is important to continue to seek means of better utilizing the tractors, which are currently utilized about 60 percent in the cooperative economy. At the same time it is important to study the convenience of coordination of truck operations of the Czechoslovak Automotive Transportation (Ceskoslovenska automobilova doprava) system and the MTS tractors on one hand, and of private trucks and JZD transport tractors on the other. Both conventional trucks and special models, such as the Soviet ANZ-2, must be popularized. The ANZ-2 is equipped with a 1.5-cubic-meter tank for the hauling of liquid manure and for such jobs as spraying and disinfecting.

Furthermore, mechanization of transportation in field threshing operations, in storehouses, and on construction sites must be considered. For every hectare in a JZD, some 230-250 quintals of various materials will be hauled as part of the drive for increased production and of the widespread investment construction program (in addition to the movement of grain in the storehouses). It is necessary, therefore, to eliminate the idea that JZDs will not be able to utilize trucks, even those with lower capacities than trucks currently used in industry and particularly in construction. Mechanization of agricultural production must even improve the already efficient elevators used for movement of sacks, manure, construction materials, and the like. The Soviet UM-0.3 manure loader, which can lift 0.40 cubic meter of manure to a height of 2.8 meters, will be introduced and will operate with existing wheeled tractors.

Further increases in labor productivity and decreases in production costs can be achieved through electrification of various tasks, particularly in livestock production, in storehouses, and in production of vegetables and similar crops. Utilization of electricity is inadequate in Czechoslovak agriculture. In 1947, only 3,600 kilowatt-hours per 100 hectares of land were used, whereas in some nations 24,000 to 32,000 kilowatt-hours were required for the same area. Although consumption of electricity in Czechoslovak agriculture increased substantially in recent years, maximum utilization of electricity was not achieved. In the very near future, consumption of power in Czechoslovak agriculture will have to be almost doubled. This goal is particularly important in view of the fact that each 1,000 kilowatt-hours of power used in agriculture is equivalent to the labor of one agricultural worker. Furthermore, the electrification of agricultural tasks reduces the strenuousness of the work and improves its quality. Greater utilization of electricity will be particularly important in such tasks as milking, watering of livestock, preparation of livestock feeds, transportation of supplies in barns, shearing of sheep, and irrigation of crops.

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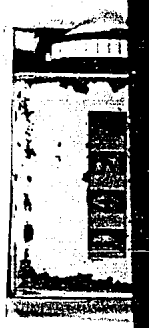

The over-all productivity of electrical milking is 2.5 times that of a manual milker, and the milker's job becomes easier and healthier with the use of electric milking machines. With the electrification of watering of livestock, the manual labor involved is reduced to one tenth the amount required otherwise, while milk production can be increased 10-15 percent as result of supplying the cows according to their individual water requirements. At the same time, the difficult tasks connected with manual watering are eliminated, and the attendants can devote their attention to other tasks.

Very satisfactory results have been achieved in the electrification of the preparation of livestock feed. This includes the use of power in the chopping of fodder, crushing of grain, washing of potatoes and beets, electrical scalding of potatoes, and similar tasks. Without such complex mechanization, manpower requirements are three to four times as high and the feed is not as well prepared.

Experience has shown that some 50-70 percent of the time required for livestock feeding is spent in carrying the feed. Thus the mechanization of feed transportation in the barns must receive major attention. This will include the building of elevated tracks and installation of motorized carts and other facilities which will completely eliminate physical strain. Labor costs can be cut in half if mechanization of barns is completed promptly. Rather than wait for the further development of transportation equipment for barns, it is essential that efficient barn equipment already available be installed. This must be made possible by the delivery of high-quality equipment, and by a proper pay scale and an effective bonus system. The present wage and bonus systems in some sectors, such as the state farms, do not promote barn mechanization; in fact they hamper it.

Some thought must be given to moving the manure from barns direct to manure pits or wagons by conveyer belts equipped with scrapers. From an operational standpoint this is economical even though some of the conveyer belt systems have not yet been perfected.

The electrical shearing of sheep is likewise important. While electrical shearing is not entirely new to Czechoslovakia, there should be greater utilization of shearing aggregates which can raise labor productivity to three or four times the present level and the amount of wool by 8-10 percent. The shearing can be completed in less time while the quality of the wool is protected. At the same time the digestive processes of the sheep are disturbed to a lesser degree, and the chances of injury to the sheep are reduced. The simple assembly of the shearing aggregate on a truck permits shearing in barns as well as in open pastures; this is a particularly valuable feature at the first shearing.

In crop production it is important to consider possible uses of electricity in irrigation. The cheap power provided by hydroelectric power plants favors the electrification of irrigation. Reports from the USSR prove the superior economy of electrified irrigation. According to these records, 4 work hours are required to deliver one cubic meter of water to the field if draft horses are used, 0.03 work hour if internal-combustion engines are used, and 0.02 work hour if electric motors are used. To spray one cubic meter of water, 4 work hours are required if draft horses are used, 0.08 work hour when internal-combustion engines are used, and 0.06 work hour when electric motors are used. For each cubic meter of water [delivered and sprayed?], 0.13 kilogram of fuel is used in an internal-combustion engine, whereas the same task can be accomplished with the consumption of only 0.28 kilowatt-hour of power.

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The cost of the fuel consumed for [in the delivery and spraying of?] each cubic meter of water is 14 percent lower in the case of electric power [than in the case of internal combustion engines?]. From this standpoint it will be necessary to concentrate in future years on the improvement and expansion of electrified irrigation.

The possibilities which have been mentioned do not by any means exhaust all the feasible uses of electric power in agriculture. Lighting of greenhouses, poultry houses, and calf barns, the disinfection of grain against pests, and the operation of hatcheries, mechanized workshops, and other facilities provide excellent opportunities for further electrification.

Further mechanization of agricultural production will require the maximum efforts of designers, workers, and operational technicians. At the same time the utilization of mechanization will require the maximum attention of responsible agricultural personnel, including those in MTS and on state farms, as well as all tractor operators, agronomists, zootechnicians, and other agricultural workers. Thus it is essential that the direction of future development of agricultural mechanization be known. The basis of agricultural technology and economics must also be understood in order that agricultural machinery may serve to increase agricultural production.

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