

Sugar Beet Mechanization in the U.S.S.R.

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Received for publication December 14, 1961

Sugar beets are grown principally in the Ukraine area on collective farms and in Central Siberia on state farms. In the New Lands area in Central Siberia where 80 million acres have been brought under cultivation in 5 years, spring wheat is now the main crop. Thirty-five percent of all cropland is in wheat; 1.1 percent in sugar beets. However, the plan is to raise more sugar beets and less wheat in the future. In 1958 there were 5,750,000 acres of sugar beets in the Soviet Union; in the next five years the plan is to reach 8,500,000 acres. The land devoted to sugar beets has been increasing steadily since 1945.

Slightly over 50 percent of the population lives on the land. There are 6500 state farms and 33,400 collective farms in the U.S.S.R. The average size of a state farm is 22,000 acres and of a collective farm 7000 acres.

Plowing is done to a depth of 13 to 14 inches for sugar beets. Plans call for going to 16 inches depth in the near future. The following fertilizers per acre are recommended in the Ukraine: phosphate, 150 lb (20% P); ammonia, 40 lb (30% N); and potassium, 40 lb (30-60% K). Where available, 4 to 7 tons of manure per acre are used for sugar beets. Sugar beet and dairy enterprises often are on the same farm.

A spacing for mature sugar beet plants of 6 to 9 inches after thinning is desired. A 12-row sugar beet planter was being tested which placed rows 18 inches apart. Another unit was seen with three separate six-row units mounted on a three-point hitch—one behind and one to each side of a crawler tractor. Each of the units could be operated independently with the hydraulic system.

On one state farm visited, 250 acres were used for seed stock. A large trencher made a ditch two feet wide and six feet deep. The sugar beet roots were placed in the trench at a depth of more than 2½ feet. A one-inch layer of soil was placed over each layer of roots in the trench and the top 2½ feet filled with soil to prevent freezing. The root stocks are used for seed production the following spring.

Whole seed was used exclusively; no segmented seed was being used. Monogerm seed was being tried on an experimental basis and it was anticipated that 250,000 acres would be planted in

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1959. With a plant population of 28,000 per acre, approximately 15 percent higher yield was claimed as compared with a plant population of 40,000.

Normally about 40 man-hours are required per acre to block and thin the sugar beets. When a moving covered platform was used to transport the workers, the labor requirement for thinning was 20 man-hours per acre. Mechanical thinners were being used on an experimental basis. Cross cultivation with conventional small duck-foot tools followed by manual thinning was being used on a field scale basis which required 30 man-hours per acre. Ninety percent of all labor before harvesting was spent on manual thinning and weeding.

The most popular harvester is a three-row unit which grabs the beet, and carries it to the rear of the machine where the top is removed. The tops are placed in one container and the topped beets in another. Each is accumulated and then dropped in separate piles on the field. Women clean the piles of sugar beets—usually four women to a group—which requires about 40 man-hours per acre. Eighty-five percent of all labor in harvesting sugar beets is used in cleaning and loading. The tops are used for silage and animal feed.

About four to six times as much labor is spent on production of sugar beets in the U.S.S.R. as compared to the U.S.A. In 1956, the U.S.A. required 0.23 man-hours per hundredweight of yield; in the U.S.S.R. on state farms, 0.95 man-hours per hundredweight; and on collective farms 1.41 man-hours per hundredweight were required for sugar beet production (Volin, 1958).

The beets weighed about 2 pounds each. The sugar content is from 17 to 18 percent. The director of one farm indicated that 80 percent of the Ukraine is now machine-harvested, 15 percent mechanically lifted and the remainder manually harvested. There are 30,000 sugar beet harvesters in the Soviet Union.

In the Altai region in the New Lands area, approximately 6 to 7 tons per acre yields are obtained; in the Ukraine 8 to 9 tons per acre. The average yield for the U.S.S.R. has been 7 tons per acre and the U.S.A. 16.8 tons per acre during the last four years. A well-managed state farm visited by the group in the Ukraine area near Kiev produced about 16 tons per acre. Another state farm in the New Lands area produced 11 tons per acre.

The Soviet Union is dependent on sugar from beets exclusively for its source of sucrose. The acres in sugar beets and the yield of sugar beets have been increasing steadily since World War II. The production of centrifugal raw beet sugar in 1959 was 7,160,000 tons (of 2000 lb), which is double the 1951 production.

About 450 acres are cultivated for each tractor and 650 acres per combine. In the U.S.A. each tractor and combine would cover about 100 acres per machine. In the Central Siberia area there are 35 acres of tillable land per farm worker. For the U.S.S.R. there are 4.2 acres of cropland per farm inhabitant; U.S.A., 20 acres per farm inhabitant.

An experimental three-row sugar beet harvester was seen equipped with a hydraulic row positioning device that would automatically stay on the rows. Machines did not have power take-off shields for safety. In the Ukraine harvested sugar beets are left on the ground from 1 to 5 days. The harvest is usually completed by the end of October.

Small and large mechanical loaders are available and just beginning to be used for moving piles of beets to a truck or wagon. Two different sugar beet loaders were demonstrated. One was an individual unit mounted on the back of a tractor which backed into the pile and elevated the beets onto a truck. The other was mounted on the rear of the truck with a long boom-type hook which reached out and dragged the beets up onto the loader.

The beets are sold to a government-owned sugar plant. Forced ventilation of the sugar beet piles is practiced. Prices are set by the government. To encourage production, a higher price is paid for beets produced over the government plan.

All sugar sold in the Soviet Union is beet sugar which is more coarse in grain size than sugar in the U.S.A. A crystalline brown sugar is available in restaurants for coffee and tea. Sugar cubes are also available. The people on the collective farms must work one hour for enough money to buy a quart of pasteurized milk, two and one half hours for five pounds of sugar, and two months for a suit.

Table I.—Sugar beet and sugar production in U.S.S.R. and U.S.A., 1935-59.

	1935-39		1945-49		1950-56		1958	
	U.S.S.R.	U.S.A.	U.S.S.R.	U.S.A.	U.S.S.R.	U.S.A.	U.S.S.R.	U.S.A.
Acres harvested (thousands)	3100	950	2500	870	3800	880	5750	950
Yields (tons/acre)	6.5	12	6	13.5	6.5	16	7	17
Production roots (million tons)	20	9.5	12	10.5	23	13	39.5	15
Production sugar			2.3	1.5	4.0	1.9	6.2	2.3

Summary

The planting operations are well mechanized. Thinning still requires considerable manual labor. The harvesting of sugar beets is being mechanized rapidly with three-row harvesters.

These units are followed by crews of four women each to clean and finish topping the piled beets. Financial incentives are being used to encourage greater production. All sugar sold in the Soviet Union is from sugar beets.

References

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