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NEW ADVANCES IN SOVIET IRRIGATION FARMING

S. Demidov

Much work has been done during the Stalin Five-Year Plans to develop irrigation farming. Millions of hectares of land have been brought under irrigation in the Central Asiatic republics, Transcaucasus, Kazakhstan, and the grain-growing steppe regions of the European USSR and Siberia. Postwar projects concerned with increasing irrigation in agriculture, which have been initiated by decrees of the party and state, include the following:

1. Five-Year Plan for Rehabilitation and Development of the National Economy in the Period 1946 - 1950

The Five-Year Plan dealt with the restoration of irrigation systems which had been destroyed or damaged during the war in the North Caucasus, Ukraine, Moldavian SSR, and other regions. At the same time, the plan called for an increase of 656,000 hectares in the irrigated area. The plan provided for the construction of large new irrigation systems: imeni Kirov in Golodnaya Steppe, Katta-Kurgan Reservoir, Orto-Tokoyskiy Reservoir, Tedzhen Reservoir, Nevinnomyssk Canal, and systems for irrigating the Kura-Araks Lowland and the Volga-Akhtuba bottom land.

2. February 1947 Decision of TsK VKP(b)

This decision called for a considerable expansion of irrigation in the Central Russian Upland (Kursk, Voronezh, Orel, and Tambov oblasts), Volga Region, North Caucasus, Crimea, Ukraine, West Siberia, and unirrigated areas of Kazakh SSR. At the same time new irrigation construction work was being carried out and an increase in the irrigated area effected in the Central Asiatic republics and Transcaucasus.

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3. Stalin Transformation of Nature Plan

This plan includes construction of state irrigation systems and of ponds and reservoirs by kolkhozes. During the period 1949 - 1955, 44,000 ponds and reservoirs are to be created. Around them, irrigated tracts for growing grain, industrial, and other crops are to be established.

4. Kuybyshev Hydroelectric Power Plant on the Volga

This plant, to be the largest in the world, is to attain full capacity in 1955. One billion 500 million of the billions of kilowatt-hours of power which it will produce are to be used for irrigating one million hectares along the Volga. Thereby, a vast area for growing wheat, sugar beets, oil-bearing crops, and other crops will be created in the Volga steppes.

5. Stalingrad Hydroelectric Power Plant on the Volga

This plant is to be built in the period 1951 - 1956. Use of water from its reservoir will permit utilization of the northern Caspian deserts and semideserts for livestock raising and farming. Another important development resulting from the construction of this plant will be the introduction of irrigation to the Sarpinskaya Lowland and Nogayskaya Steppe, whereby favorable conditions for livestock raising and tree planting will be erected. Two billion kilowatt-hours of the plant's annual production will be required for irrigation purposes.

Immense irrigation systems will have to be built in the Volga and Caspian regions. A self-flowing trunk canal and other water conduits will supply water from the reservoir to 6 million hectares in the northern Caspian region and the region between the Volga and Ural rivers. Other irrigation systems will supply water to 1,500,000 hectares in the Volga Region, Volga-Akhtuba bottom, and Caspian Lowland.

6. Main Turkmenian Canal from the Amu-Dar'ya River to Krasnovodsk

Preparatory work for construction of this canal will be begun in 1951. It will draw 350-400 cubic meters of water per second and later possibly 600 cubic meters per second from the Amu-Dar'ya River for irrigating land in the southern part of the Caspian Depression in western Turkmenia, land around the lower reaches of the river, and land in the western part of the Kara-Kum Desert. All water is to be utilized for irrigation and none is to be discharged into the Caspian Sea. The project will make an area of 1,300,000 hectares suitable for cotton growing and up to 7 million hectares of the Kara-Kum Desert suitable for grazing purposes. Trees will be planted along the main canal and secondary canals, around industrial enterprises, and around populated places.

7. Kakhovka Hydroelectric Plant on the Dnepr

Construction of this plant and of the South Ukrainian and North Crimean irrigation canals is also part of the Stalin Transformation of Nature Plan. The project will permit irrigating 1,500,000 hectares and supplying water to 1,700,000 hectares in the southern Ukraine and northern Crimea and will result in a considerable increase in cotton and wheat growing and livestock raising.

8. August 1950 Decree Regarding Conversion to New Irrigation System

Based on a study of the experiences of leading kolkhozes and sovkhozes in Central Asia, the Transcaucasian republics, and the steppe regions of the European USSR and Siberia, this decree of the Council of Ministers USSR sets

forth the task of accomplishing during the next 3-4 years a conversion from permanent irrigation canals to temporary irrigation canals on all kolkhozes and sovkhozes in all regions where irrigation farming is practiced.

Existing irrigation systems are characterized by a dense network of canals which cannot be crossed by tractors and agricultural machines. The distance between canals does not exceed 80-150 meters. Irrigated land is divided into small tracts measuring 1.5-10 hectares in size. Such small tracts hinder the productive use of tractors, seeders, cultivators, cotton harvesters, and other machines.

For example, the Fergana irrigation system in the Fergana Valley of Uzbek SSR serves an area of 610,000 hectares, but this area is divided into irrigated tracts measuring only 0.5-10.0 hectares. The Khorezm irrigation system serving an area of 260,000 hectares has irrigated tracts measuring only 4 hectares. Irrigation systems in southern Kirgizia serving 120,000 hectares have irrigated tracts of only 1.5 to 10 hectares. Similar situations prevail in such large cotton-growing areas as those served by the Chirchik-Angren (Uzbek SSR), Murgab (Turkmen SSR), South Kazakhstan, and other systems.

Such small irrigated tracts are unsuited to modern methods of growing cotton, sugar beets, wheat, and other crops. Conversion to the new irrigation system aims at eliminating obstructions to modern agricultural methods and involves considerable reconstruction of existing irrigation systems.

Most irrigation systems include:

a. Trunk canals, which carry water from the reservoir, lake, or river to the edge of the fields to be irrigated;

b. Distribution canals, which distribute water between individual kolkhozes, sovkhozes, groups of these, and regions; and

c. Irrigation canals, which carry water from the distribution canals to the irrigated tracts.

Irrigation canals are arranged in the form of a dense network and are located at short distances from each other. They are about 30-50 centimeters deep and run along the top of earthen embankments 1.5-3 meters wide.

It is not difficult to see that such a dense network of permanent canals and such small irrigated tracts gives rise to a number of negative factors in organizing irrigation farming procedures.

These negative factors include, first of all, losses of up to 4-6 percent and, in some cases, up to 10-12 percent of the land on which permanent canals are located. In addition, the shoulders of the embankments cannot be planted and become weed-covered; tractors, cultivators, and harvesting machines do much damage to crops when turning around at the ends of the tracts. Experience over many years shows that damage caused by machinery in this manner reduces the harvest 3-5 percent.

A very serious disadvantage of permanent canals and small irrigated tracts is that they obstruct the productive use of large tractors, combines, seeders, cultivators, cotton pickers, and other agricultural machines. Experience has also shown that a dense network of permanent canals increases water losses through seepage into the subsoil, which raises the ground water level and leads to development of swampy conditions on the irrigated land. These conditions, in turn, call for the expenditure of labor and materials for drainage canals. Labor required for cleaning permanent canals of silt, debris, and

weeds runs into millions of working days annually on the kolkhozes of the Central Asiatic republics alone. An average of about 4.5 cubic meters of silt must be removed from the canals for every hectare of cotton irrigated, about 3 cubic meters for every hectare of grain irrigated.

In the interest of more productive utilization of irrigated land, and modern agricultural machinery, and in the interest of improved irrigation operations and more economical use of water, many leading kolkhozes and sovkhozes, agricultural experimental stations, and scientific research institutes have worked out and successfully applied an improved method of irrigation system construction. This method consists of replacing permanent irrigation canals with temporary canals which are used for only one growing season and then destroyed. The new irrigation system is being used with success on a number of kolkhozes and sovkhozes in various parts of the country.

On the "Kommunist" Kolkhoz in Yangi-Yul'skiy Rayon, Uzbek SSR, temporary irrigation canals are opened in spring and closed in fall. They are shallow enough so that tractors and agricultural machines can cross them. The number of irrigated tracts on this kolkhoz was reduced from 300 to 95. Tracts 2 hectares or smaller in size comprise only 5 percent of all tracts as compared with 26 percent of all tracts under the old system. Twenty-three percent of the tracts are larger than 10 hectares. The length of the irrigation network was reduced from 130 to 46 meters, on the average, per hectare of irrigated land.

The "Iskra," imeni 17th Congress VKP(b), and "Kommunist" kolkhozes in Turkmen SSR increased their irrigated land areas 10-12 percent and reduced water losses 15 percent by replacing permanent irrigation canals with temporary canals.

Results in the irrigated grain-growing regions are interesting. The "Krasnyy Geroy" Kolkhoz, Pugachevskiy Rayon, Saratov Oblast, reduced the number of its permanent irrigation canals from nine to two. The size of irrigated tracts was increased to 42-43 hectares. Establishment of temporary irrigation canals reduced the volume of silt-removal work required per hectare to one fourth of that previously necessary.

By converting to the new system, Sovkhoz No 97 increased its irrigated tracts to 40 hectares and cut the length of its irrigation system from 23.6 to 8.2 kilometers. The "Put' Kommuny" Kolkhoz, Saratov Oblast, increased its irrigated tracts to 55 hectares by converting from permanent to temporary irrigation canals.

Much work in converting from permanent to temporary irrigation canals and simultaneously increasing the size of irrigated tracts has been carried out on the kolkhozes and sovkhozes of Khakass Autonomous Oblast, Krasnoyarsk Kray, by the Khakass Experimental Station for Irrigation Farming. The station (A. Panteleyev, director) has been occupied with studying conversion problems for a number of years. It has conducted broad experiments in developing the new system and introducing it on kolkhozes.

The All-Union Scientific Research Institute for Hydraulic Engineering and Improvement has carried out research in converting from permanent to temporary irrigation canals on the kolkhoz imeni Stalin, Maryyskiy Rayon, Turkmen SSR. There, irrigated tracts were increased in size to 28-35 hectares.

Advantages of the new irrigation system adopted by the government include more effective utilization of machinery on larger tracts, reduced water requirements, and increased efficiency of the irrigation system.

Conversion to the new system comprehends retention of the old permanent trunk and distribution canals but replacement of the old permanent irrigation canals with temporary canals to be used for only one growing season.

The government has set up a program for conversion to the new system in all regions where land is irrigated. In the course of 4 years, 1950 - 1953, the following numbers of hectares of irrigated land are to be converted to the new system: 1,500,000 hectares in Uzbek SSR, 600,000 in Kazakh SSR, 210,000 in Tadzhik SSR, 350,000 in Turkmen SSR, 450,000 in Azerbaydzhan SSR, 507,000 in Kirgiz SSR, 200,000 in Georgian SSR, 150,000 in Armenian SSR and 325,700 in the RSFSR.

The example of kolkhozes in Yangi-Yul'skiy Rayon, Uzbek SSR, illustrates how conversion to the new irrigation system will create the conditions for a larger cotton harvest. At present, the total length of permanent irrigation canals on kolkhozes of this rayon is 1,512 kilometers. After conversion, the total length of permanent irrigation canals will be cut to 500 kilometers. Thus, more than 1,000 kilometers of permanent canals will be replaced with temporary canals, and the conversion will free 450 hectares of land for planting of cotton and other crops. Conversion will reduce the number of irrigated tracts from 5,000 to 1,000 and will add 800 hectares of planting area through elimination of field boundaries, superfluous roads, etc.

In the course of 3 years, it is planned to convert the kolkhozes in Yangi-Yul'skiy Rayon from a nine-field crop-rotation system with three perennial grass fields to a seven-field system with two grass fields. This measure will result in increasing the cotton-growing part of the crop-rotation area from 66 to 71 percent of the entire area, or in increasing it by 650 hectares. As early as 1951, it is planned to obtain an average cotton yield of 40 centners per hectare.

On the 600,000 hectares to be converted to the new irrigation system in seven oblasts of Kazakh SSR during the period 1950 - 1953, there are now 66,200 irrigated tracts with 64,300 kilometers of irrigation canals. A total of 34,300 hectares of fertile land is occupied by the permanent irrigation canals. Conversion will reduce the number of irrigated tracts by 46,000, the length of canals by 40,000 kilometers. At present, there are 110 meters of permanent irrigation canals per hectare of irrigated land; after conversion, there will be 40 meters per hectare.

Conversion to the new system of irrigation will require a sharp increase in mechanization of such laborious work as opening and closing temporary irrigation canals, rendering distribution canals more efficient, improving operation of irrigation system head installations, etc. The basic units which will be engaged in these tasks are machine-tractor stations, shelter-belt stations, and machine-improvement stations.

The agricultural machinery, construction machinery, and road-building machinery industries will face great and responsible tasks in connection with conversion to the new system. In 1951 alone, 22,000 trench diggers must be produced. The machinery base of irrigation farming will be broadened by the addition of a considerable number of excavators, heavy S-80 bulldozers, graders, scrapers, and truck cranes for transplanting trees.

In Central Asia, the Transcaucasus, and some other regions, trees, mostly mulberry, are grown along irrigation canals. The governmental decree concerning conversion to the new irrigation system does not permit a reduction in the feed base for silkworm raising. Steps must be taken to increase mulberry leaf production. Beginning in the fall of 1950, new mulberry plantations are to be established.

According to the 17 August 1950 decree of the Council of Ministers, mulberry trees which can be transplanted are to be moved to special plantations which can be irrigated or are to be planted along permanent canals and

roads. When mulberry-tree stands also serve as shelter belts, their removal is not permissible unless other shelter belts are substituted for them; in the latter case, the new shelter belt must also consist of mulberry trees. Strict adherence to established rules for preserving and developing the feed base for silkworm raising is essential in accomplishing conversion to the new irrigation system.

Month-long courses for training instructors in converting the irrigation system and in irrigating according to the new method will be developed this year by local party organizations and the Ministries of Agriculture USSR, Cotton Raising USSR, and Sovkhozes. Similar courses will be developed for training instructors in mechanized operations connected with conversion to the new system. Two-month courses are being organized for engineers and technicians, and two-week courses for training senior mechanics, land organizers, and agronomists. Broad training of organizers and engineering and technical personnel is most important for successful accomplishment of conversion to the new irrigation system.

The decree of the Council of Ministers concerning conversion to the new system of irrigation is one of the most important links in a system of measures designed to further the growth of socialist agriculture.

The experience of leading kolkhozes and sovkhozes and scientific research institutes in all irrigation regions proves conclusively that properly organized irrigation is a powerful means for increasing the yield of all agricultural crops. The following data of the Institute for Grain Economy of the Southeast USSR illustrate this fact:

On an irrigated tract on the left bank of the Volga in Yershovskiy Rayon, Saratov Oblast, where natural climatic conditions are unfavorable for agriculture, spring wheat harvests for the years 1938 - 1949 averaged 44.2 centners per hectare. During this period, the smallest harvest averaged 33.7 centners per hectare, the highest 53.5 centners per hectare. At the Valuyskaya Irrigation Farming Experimental Station on the left bank of the Volga, Stalingrad Oblast, spring wheat harvests over a period of 16 years averaged 36.6 centners per hectare; no harvest averaged less than 29 centners per hectare.

Sugar-beet harvests averaged 492 centners per hectare over a period of 15 years at the Valuyskaya station, and 483 centners per hectare over a period of 5 years on the Yershovskiy irrigated tract.

The cotton yield on a large irrigated area of the "1 May" Kolkhoz, Stalingrad Oblast, was as high as 20 centners per hectare, and the sugar-beet yield on the same kolkhoz 1,200 centners per hectare.

On the Kolkhoz imeni Voroshilov, Genicheskiy Rayon, Kherson Oblast, the cotton yield reached 27 centners per hectare. Many kolkhozes in Central Asia and the Transcaucasus obtain average cotton yields of 50-60 centners per hectare on irrigated land, and sugar-beet yields of 500-600 centners per hectare.

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