

AGRICULTURE IN THE UKRAINIAN SOVIET SOCIALIST REPUBLIC

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I. General Data

The Ukrainian Soviet Socialist Republic occupies a territory of 452,000 square kilometers, with a population of 29,856,000 (according to data of April 1, 1928), of which 80.9 per cent is rural and 19.1 per cent urban.

The purpose of this report is to convey an idea of the evolution of agriculture in the Ukraine during the last few years and to set forth the main lines of its reconstruction. We shall of all present a few fundamental figures as to the condition of agriculture in the Ukraine in 1927, in order further on to be able to draw certain conclusions and to establish the general trends of its development during the past three years and also its prospects for the future.

According to data of 1927, of the entire area of agricultural land, amounting to 43,660,800 hectares, there were 40,287,400 hectares of utilizable land: plowland, 29,058,600; hay- and pasturelands, 1,888,500 hectares; forests, 3,487,600 hectares; land occupied by farm buildings, etc., 2,290,600 hectares; and miscellaneous, 3,560 hectares.

Of the total area of plowland in 1927, only 24,500,000 hectares were under cultivation, the remaining land being fallow or virgin land. Thus, the Ukraine possesses large land resources, making possible a considerable extension of the area under cultivation through the use of utilizable land that has been neglected, through the plowing up of virgin land, and through decreasing the area of fallow land.

The following table gives the sown area, by principal crops, in 1927:

<u>Crop</u>	<u>Area</u>	
	(in million hectares)	(in per cent of total)
Grain and legumes	19.6	80.0
Corn	1.2	5.0
Potatoes	1.1	4.5
Hay	0.4	1.6
Industrial crops	1.6	6.5
Sugar beets	0.59	
Sunflower	0.75	
Fiber crops (flax and hemp)	0.30	
Miscellaneous (tobacco, etc)	0.06	
Vegetables, melons, and root crops for stock	<u>0.6</u> 24.5	<u>2.4</u> 100.0

Data as to animal husbandry in the Ukraine in 1927 is given in the following table:

<u>Kind</u>	<u>Number</u> (in thous. head)
Cattle	8,379.9
Cows	3,836.6
Work Horses	3,919.3
Hogs	4,436.5
Sheep	7,901.9
Poultry (all kinds)	52,000.0

The value of the gross production of agriculture in the Ukraine, according to 1927 prices, was 2.5 billion rubles. The marketable output amounted to 625 million rubles, or 25 per cent.

II. Share Taken by Agriculture in the Ukraine in the Total Agricultural Production of the U.S.S.R.

The Ukraine, occupying only 2.12 per cent of the entire territory of the U.S.S.R., has 19.73 per cent of the entire population of the Soviet Union, constituting thus one of the most densely populated sections.

The share taken by agriculture in the Ukraine, according to the data of the Gosplan for 1927-28, in the total agricultural production of the U.S.S.R. for that period may be seen from the following table:*

		<u>U.S.S.R.</u>	<u>Ukraine</u>	<u>Per Cent of Total</u>
Total area under cultivation	(in thous. hectares)	115,576.0	25,547.0	22.1
Area under sugar beets	"	885.4	686.05	80.2
Work horses	(thous. head)	21,462.0	3,931.0	18.3
Gross output of agricultural products	(in mill. rubles)	15,196.0	2,973.0	19.56
Vegetable products	"	10,192.0	2,153.0	21.12
Fruits and vegetables	"	979.0	289.0	29.55
Animal products	"	5,004.0	820.0	16.39
Marketable output of agricultural products	"	2,554.9	670.3	26.34
Grain crops	"	608.0	231.0	38.01
Industrial crops	"	617.0	149.0	24.18
Animal products	"	1,319.4	289.9	21.97

Thus, as regards gross output and a number of other basic indexes, the Ukraine contributes approximately 20 per cent of the total for the U.S.S.R., and, as regards marketable output, more than 25 per cent. The Ukraine plays an especially important role in the production of sugar, 80 per cent of which is concentrated in the Ukraine, mainly in the so-called "wooded steppe" region, and also in the production of grain crops, particularly wheat. In 1928, although the winter crop was below normal in the basic grain producing region, the steppe, the share of the Ukraine in the total grain output was 38 per cent. The Ukraine also plays an important role in the production of fruits and vegetables, supplying about 30 per cent of the total output of these products in the U.S.S.R.

*We must remember that in 1928, on account of the fact that a considerable part of the winter wheat was destroyed by winter kill and the land had to be resown to less valuable spring crops, the total value of field crops in the Ukraine for that year was somewhat below normal.

In this brief report, then, we shall deal chiefly with the reconstruction of agriculture in the Ukraine along the line of its specialization in the production of wheat and sugar beets, touching problems of specialization in animal husbandry and other branches only in so far as they are closely bound up with the development of these two main agricultural crops of the Ukraine.

However, before passing on to an analysis of the main trends in the reconstruction of agriculture in the Ukraine and to an exposition of the problems of its specialization in the various regions, it is necessary to deal in brief with the achievements attained in agriculture in the Ukraine during the past three years (1927-30), in order to possess a more or less complete picture of its evolution during this period and of the economic basis upon which its further reconstruction rests.

III. The Main Achievements in Ukrainian Agriculture, 1927-30

Agriculture in the Ukraine during the past three years has recorded a number of most noteworthy achievements, both quantitative and qualitative.

As a result of intensive effort on the part of the peasants and industrial workers and the mobilization of considerable resources on the part of the Government in the way of providing seeds, machinery, and fertilizer, the area sown in the sowing campaign of 1930 amounted to 27,647,000 hectares, an increase of 22 per cent over 1913 and of 12 per cent over 1927.

The percentage of the sown area planted to industrial crops and other "row" crops showed a sharp increase, while the percentage planted to grain decreased (although its actual area increased in comparison with 1913).

The tremendous increase in sown area in 1930, in comparison with 1927, is closely connected with the successes attained in collectivization. The number of collective farms during this period increased from 5,566 to 20,759, and the percentage of peasant farms collectivized from 1.35 per cent to 38.8 per cent. A considerable increase (40 per cent) was also recorded in the

sown area of the state farms, which rendered substantial aid in sowing the fields of the neighboring peasants who had joined together in collective farms.

An important role in the increase in sown area was played by the greater utilization of draft power as a result of the organization of machine-horse and machine-tractor stations. These stations, in the majority of cases, were organized by collective farm cooperatives by bringing together in one place horses, tractors, and other machinery. The Government, on its part, provided these stations with additional tractors and machinery and with credit for acquiring horses and machinery. A number of machine-tractor stations, in regions where the tractor had not yet been extensively employed, were organized by the Government through the specially constituted body, "The Machine-Tractor Center of the U.S.S.R." ("Tractor Center" for short), which also raised funds from the peasants in the form of assessments per each hectare of land (3-5 rubles). A group of collective farms served by a machine-tractor station has the right, according to the statutes, during the course of a definite period of time to recompense the Government for the cost of the machinery of the machine-tractor station, thus converting it into socialized capital of the group of collectives. Machine-tractor stations -- both those organized by the Government and those organized by collective farm cooperatives -- work on the basis of agreements with the collective farms. A machine-tractor station is obligated, according to such agreement, to perform within a definite period of time, on the lands of the collective farms served by it, all the necessary work with its tractors and machinery, to give the collective farms the advisory services of its agronomical staff, to make the necessary repairs in its shops, and to assist in the organization not only of large grain farms but also of cattle-breeding farms. The collective farms, on their part, furnish the seed and all the necessary labor power (tractor drivers, etc.) and look after the tractors in the field (bringing water, etc.). The stations work either on a monetary basis, setting definite rates for the different kinds of work performed for each collective farm, the final accounting being made after the harvest, or receive a definite share of the crops (one-third to one-

fourth). The former manner of recompense is more common than the latter.

Machine-horse stations are organized by the collective farms themselves or by collective farm cooperative groups, with credit aid from the Government, and use mainly the horses, agricultural machinery and implements of their members.

The average territory served by one machine-horse station is from 1,000 to 3,000 hectares, while that served by one machine-tractor station is from 50,000 to 50,000 hectares, depending upon the size of the station and upon the various economic conditions in each respective district.

As regards the organization of machine-tractor stations, the Ukraine constitutes one of the most advanced republics of the Union. The three years of experience which it has already acquired in this work is extensively drawn upon by other sections of the U.S.S.R.

In the spring of 1930 15,200 tractors (twice as many as in 1927) were used on the fields of the Ukraine -- on the state farms, large collective farms, and by the machine-tractor stations (both government and collective farm cooperative stations). On the collective farms two-thirds of the total draft power was socialized, and during the sowing campaign not only the collective farms but also part of the individual farms not united in collectives carried on the sowing collectively, organizing brigades of from 30 to 50 men with machinery, implements and draft power to a corresponding amount.

The increase in sown area of the individual and socialized sectors of agriculture in the Ukraine is shown in the following table:

	<u>Sown Area</u>			
	1927 (in thous. hectares)		1930 (in thous. hectares)	
	(In per cent)	(in per cent)	(in per cent)	(in per cent)
<u>Socialized Sector</u>				
State Farms	606.2	2.5	1,006.1	3.6
Collective Farms	264.6	1.0	11,105.8	40.2
<u>Individual Sector</u>				
	<u>23,629.2</u>	<u>96.5</u>	<u>15,535.3</u>	<u>56.2</u>
Total	24,500.0	100.0	27,647.2	100.0

Whereas the total sown area increased 12 per cent, there was a decrease in the sown area of the individual peasants, the main portion of whom had joined the collective farms, this movement having taken on a mass character.

One of the greatest successes of the sowing campaign of 1930 was the considerable overfulfillment of the sowing campaign for sugar beets and other industrial crops. The area sown to sugar beets in the Ukraine amounted to 922,000 hectares, exceeding the sown area in 1913 by almost 40 per cent. For the first time there were sown in the Ukraine (in the extreme south on the shores of the Black Sea) 19,000 hectares of cotton* and 45,000 hectares of soy beans, the latter being a practically new crop for the U.S.S.R.

The supply of mineral fertilizers was sufficient to make up 75 per cent of the fertilizer used on the beet-sugar fields; about 50 per cent of the grain sown was selected seed; 75 per cent of all the seed sown was cleaned and chemically treated (to safeguard against fungous diseases and various types of blight). All of these measures, together with the more or less favorable climatic conditions in the spring of 1930 (adequate rainfall and warmth), resulted in a higher yield and in a large increase in gross and marketable output in 1930.

An especially large increase in yield was registered on the state and collective farms, thanks to the high level of organization and the greater productivity of labor in large-scale farming and also to the use of selected seed, fertilizers, proper cultivation, and, in general, to the higher technical level of farming.

In comparison with the yield on individual farms, which may be represented as 100, the increase during recent years in yield of the chief grain crops on state and collective farms is recorded in the following table:

	<u>1928</u>	<u>1929</u>
<u>Winter Rye</u>		
State Farms	120.7	137.5
Collective Farms		
Communes	110.0	105.2
Artels	115.9	103.3

*According to latest information, the cotton sowings in the Ukraine were a success, and the sown area for 1931 has been set at 160,000 hectares.

(table cont'd)

	<u>1928</u>	<u>1929</u>
<u>Spring Wheat</u>		
State Farms	130.8	134.9
Collective Farms		
Communes	158.0	105.9
Artels	135.2	102.9
<u>Oats</u>		
State Farms	192.3	163.1
Collective Farms		
Communes	138.3	118.7
Artels	144.1	109.9

The above data shows that the yield on state and collective farms was higher than that on individual peasant farms. Despite the unfavorable conditions of 1929, the yield on state farms remained at a comparatively high level and for certain crops was higher than in 1928. On collective farms there was a decreased yield in 1929, which may be accounted for by the fact that collective farms, being newly formed, had not yet succeeded in getting their field work properly organized, while the state farms, which had carried on their work on a high technical level for a number of years, were able to keep their yield more stable in face of unfavorable climatic conditions.

Preliminary data as to the crop of 1930 show that the yield will be considerably higher than in 1927. Consequently, there is every reason to assume that the minimum increase in yield set by the Plan to be attained by the end of the five-year period (1933)-- 35 per cent above the average yield in the preceding five years (1925-1928) -- will be successfully achieved, inasmuch as the growth and increasing strength of the state and collective farms and the predominant position they are taking in agriculture as large-scale, more productive types of farms, guarantee a further increase in yield. The good crop of 1930 vouchsafes an adequate supply of feed, thus constituting a real feed basis for the re-establishment and development of animal husbandry, which is being further assured by means of measures being taken for the organization of large state and collective stock-breeding farms.

IV. Brief Characterization of the General Conditions of Agricultural Production in the Various Regions of the Ukraine.

Passing on to an analysis of the basic problems of reconstruction of agriculture in the main regions of the Ukraine, we consider it necessary to give, in its broadest outlines, a brief characterization of the physiographic (climatic and soil) and economic conditions of agricultural production. In general the conditions of agricultural production in the Ukraine are most favorable for its development. The average annual temperature is +8° (Celsius), and the average annual precipitation about 450 millimeters. The soil, for the most part, is a deep, black soil, the most fertile in Europe. However, soil and climatic conditions vary considerably in the different parts of the Ukraine, which, as regards physiographic conditions, may be divided into the following principal regions: forest, wooded-steppe, and steppe. The wooded steppe region, in turn, is divided into two sections -- the right-bank and the left-bank (of the Dnioper River). However, the differences in physiographic conditions as between these two sections of the wooded-steppe region are not great. The left-bank section has a slightly lower average precipitation and a lower average annual temperature.

The three main regions of the Ukraine may be characterized in brief as regards physiographic conditions by the following data:

	Forest Region	Wooded Steppe Region	Steppe Region
Agricultural Area (in per cent. of total agricultural Ukraine)	15	40	45
Various Classes of Utilizable Land (in per cent. of total agricultural area of region)			
Plowland	54.4	74.6	82.5
Hay-and Pastureland	14.3	6.3	2.2
Forests	21.7	8.7	2.9
Other	9.5	10.4	12.4
Average Annual Temperature (celsius)	6°	8°	10°
Average Annual Precipitation (in millimeters)	550	450	350
Soil	Sandy and ash forest soils	Deep black soil	Southern black soil and clay soil

As we see from the above, the forest region is a forested area, as its name indicates, and has comparatively poor soil. A high annual precipitation and the considerable quantity of hay- and pasture-land provide suitable conditions for the development of dairy farming, hog-raising, and the cultivation of potatoes, flax and other fiber crops.

The wooded-steppe region, with much less forested area and more plowland, possesses the best black soil and also fully adequate precipitation and an average annual temperature which assures the best yield of all crops and the possibility to develop agriculture in the most highly intensive way.

The steppe region, with its large amount of plowland and extremely insignificant percentage of forests, is comparatively the most arid district, especially in its southern part along the shores of the Black and Azov Seas, where the amount of precipitation falls to 250 - 300 millimeters with a higher average annual temperature. The steppe region is a typical grain region, where the development of cattle-raising is already possible on the basis of corn and hay rather than on wild forage grasses. Moreover, the climatic conditions here are favorable for cotton and other semi-tropical industrial crops and also for truck gardening.

As regards economic conditions, the chief regions of the Ukraine may be characterized as follows:

The most thickly populated region is the wooded-steppe region, where the density of population is 80.5 persons per 1 square kilometer. Possessing 45 per cent of the total sown area of the Ukraine, the wooded-steppe region is characterized by the very small size of the peasant farms: 68 per cent of the peasant households in this region possess under 4 hectares of sown area, while in the steppe region 61.6 per cent of the peasant households possess from 4 - 15 hectares of sown area. The plentiful supply of labor for agriculture and the favorable soil and climatic conditions, notwithstanding the comparatively low technical level of agriculture, assures high and stable yields. The average crop of winter wheat, barley, and corn in the wooded steppe region is one-and-one-half times as large as in the steppe region.

However, despite these favorable conditions for the development of intensive agriculture, we find that grain crops predominate in the wooded-steppe region, being used more for local consumption than for market, while the proportion of the most valuable grain crop -- winter wheat -- is very small, amounting to only 7.6 per cent. Sowings of sugar beets and of a number of other crops requiring intensive cultivation (tobacco, etc.) are concentrated chiefly in the wooded-steppe region, but nevertheless these take up only a very insignificant portion of the total sown area.

Agriculture in the steppe region bears a marked grain character, with winter and spring wheat occupying the greater part of the sown area.

The above-stated general characteristics of agriculture in the chief regions of the Ukraine are reflected in the make-up of the marketable output. In the forest region 51.9 per cent of the marketable output is composed of animal products. However, this output, insignificant in actual quantity, has importance chiefly for the local market. In the wooded-steppe region the bulk of the marketable output is formed by sugar beets (40 per cent) and animal products (28 per cent). In the steppe region 71.5 per cent of the marketable output falls to the share of grain crops (37.7 per cent to the share of winter and spring wheat).

Thus, while the wooded-steppe region has specialized (since 1927) in the production of sugar and animal products, the steppe region is a grain region, producing the greatest part of the wheat and a considerable amount of animal products (meat and butter). Grain farming here forms the basis for the development of animal husbandry, which utilizes corn, grain forage, and grain by-products (straw, etc.).

V. Sugar Beets -- Their Role in the Agriculture of the Ukraine

The growing of sugar beets plays a very important role in the agriculture of the wooded-steppe region, which is the chief region for sugar-beet raising. As has already been pointed out above, the Ukraine contributes 80.2 per cent of the total

sugar output in the U.S.S.R., having on its territory 180 sugar factories, of which 152 are located in the wooded-steppe region.

Thirty per cent of the beets used in the sugar-beet industry are obtained from the state farms of the Sugar Trust and from farms of cooperative organizations (Ukrseksukr"), and 70 per cent from collective farms and individual peasant farms. The increase in sowings of beets by the peasants since the revolution is one of the most important signs of progress in the agriculture of the wooded-steppe region.

Prior to the revolution peasant sowings of beets contributed only about 40 per cent of the raw materials required for the sugar factories, the balance being furnished by the large farms of the sugar-factory owners and by farms of so-called "planters", i. e., big tenant farmers, who either themselves raised beets on rented land or, renting land from the landowners, subleased to small farmers for sugar-beet raising.

The revolution, having done away with land ownership by the big landowners and with the "planter" system, organized on the nationalized land state farms of the Sugar Trust, which occupy in the Ukraine 450,000 hectares of sown area, and paved the way for the rapid development of peasant sowings of beets.

The state farms of the Sugar Trust, being fully established by 1927, began thenceforth to yield a profit to the state. Moreover, the Sugar Trust, from the date of its organization, has rendered real aid to the neighboring peasant population as regards the development of sugar-beet raising. The farms of the Sugar Trust are usually united in agricultural combines, each including one or two sugar-beet factories and several large sugar-beet farms.

The combines of the Sugar Trust, in accordance with agreements made with the neighboring peasantry, provide the beet-growers with beet seed, selected seed of winter wheat and other grains (in exchange for ordinary peasant grain), mineral fertilizer, seed drills (usually rented out), and so forth. The poorest farms without any horses can secure deep plowing for beet-raising by the use of the machinery of the state farms or by

securing credit for the leasing of machinery and draft power. A sugar factory, in accordance with similar agreements, at stated periods makes cash advances to beet-growers for plowing their land, for cultivation of the beets, and for harvesting (digging the beets). The beet-growers are obliged, on their part, to deliver to the factory their entire beet crop. The final accounting for the beets delivered is made -- at a fixed price set beforehand by the agreement, and deducting all the cash advances granted -- on the first of November, i. e., after the delivery of all the beets to the factory. In addition, the beet-growers receive further recompense in kind, as determined by the agreement, in the form of by-products of the beet-sugar industry (beet-pulp and syrup) which are used as cattle feed.

This system of agreements between the state farms of the Sugar Trust and the peasants raising beets has had a marked influence upon the development of peasant beet-growing, not only quantitatively, but qualitatively, bringing about an increase in yield and furthering the development of peasant agriculture.

However, prior to 1930 the tempo of development of peasant beet-growing bore an uneven character, and the yield had not yet attained the average pre-war level of yield of the beet farms of the big landowners, the average for the period 1925-28 being 135 centners per hectare. The sharp fluctuations from year to year in the yield of the beet crop, which is subject to mass attacks of various plant pests (as, for example, that of the meadow moth in 1929) and requires very careful cultivation, resulted in a disinclination on the part of the peasants to sow beets, preferring to sow other crops, the market prices for which happened to be higher in each respective year. But the main cause responsible for the difficulties in the way of development of peasant sowings of beets and for hindering an increase in yield was the extremely scattered nature of these sowings.

Two-thirds of the beet-growers sowed only about one-quarter to one-half a hectare of sugar beets per peasant farm.

Moreover, a considerable quantity of beets were sown not in the field but on the land adjoining the peasant huts. The main efforts of the People's Commissariat of Agriculture, of the Sugar Trust,

and of the local agricultural organs were constantly directed toward the establishment, by voluntary agreement of the population, of a proper system of crop rotation for entire villages or groups of beet-growers, and toward the concentration by this means of all the beet sowings in one place, in order to make possible better cultivation and an increase in yield. By 1928-29 about one-third of the beet-sowings were made in accordance with such a socialized system of crop rotation, but this plan by no means succeeded everywhere. The scattered sowings of beets by the peasants resulted likewise in the cost of delivery to the factory being higher, which increased the cost of production. It suffices to state that even in sections where beet-growing was most highly developed the average share of beets in the total sown area amounted to only 4 -15 per cent.

The rapid development of collective farms in the spring of 1930 resulted in great successes in the field of beet-sowing in the wooded-steppe region. The area sown to beets suddenly increased to 922,000 hectares, exceeding the 1929 area by 50 per cent. Beet sowings on collective farms constitute one of the main crops in the rotation system, and are concentrated in one place, which assures better cultivation, increased yield, and cheaper delivery to the factory. The Government, working through the Sugar Trust and through the beet-growers' cooperatives and dealing with collective farms which sow not half a hectare but from 50 to 100 hectares of beets, is thus able to plan in a systematic manner the increase and allocation of beet-sowings.

Thanks to collectivization, a real possibility has developed for concentrating beet-sowings in the vicinity of sugar factories and for a better utilization of the equipment of the factories. The People's Commissariat for Agriculture of the Ukraine, having noted an increase in the percentage of beet-sowings in the sown area of the main beet-growing districts from 4 per cent to 16-17 per cent, has proposed to bring the area sown to beets up to 1.8 million hectares by the end of the five-year period (1933).

The working up of the immense quantities of beets in the factories will be taken care of by the Sugar Trust, both by means of lengthening the period of operation of the factories and by means of organizing the dehydration of beets (by the Italian method, Do-Pekki) and by the construction of new factories of very large capacity.*

The development of beet-growing on the scale outlined in the revised plan is also guaranteed by the organization of numerous machine-tractor and machine-horse stations, both in connection with the state farms of the Sugar Trust and in connection with groups of collective farms united in district federations. In the current year 27 machine-tractor stations have already been organized in the wooded-steppe region.

The growth of the tractor and chemical industries of the U.S.S.R. assures an increase in the supply of tractors and mineral fertilizers, which in turn makes it possible to improve greatly the quality of soil cultivation and to increase the yield and output of sugar-beets per hectare to a point far above the pre-war level.

The development of beet-growing on the scale planned by the People's Commissariat for Agriculture of the Ukraine, under a correct system of crop rotation -- four-field type (fallow, winter grain, beets, spring grain) -- will make possible an increase of the area under winter wheat, which gives the highest yields** in the wooded-steppe region, and also an increase of the area under corn and hay.

The utilization of by-products of the beet-sugar industry, of corn, hay, etc., both for silage and for cattle-feed in fresh form, makes possible the development of animal husbandry, which in the western section of the wooded-steppe region will be developed along the lines of an increase in dairy and beef-cattle farming and in the central section and part of the eastern section along the line of hog-raising.

*One of such factories, built at Lohvitsa, Poltava district, already began operations in the fall of 1930.

**On the state farms the yield of winter wheat has averaged 18-20 centners per hectare, rising in certain years to 30-32 centners (in 1929) on the best farms.

In order to bring out the leading role of the state and collective farms, which have served as an example for the neighboring peasantry, I give below the share of the various crops in the total sown area on state, collective, and individual peasant farms in 1928:

	<u>State Farms</u>	<u>Collective Farms</u>	<u>Individual Peasant Farms</u>
	(in per cent)		
Rye	2.9	12.3	26.2
Winter wheat	17.3	14.4	9.7
Other grain	33.4	39.9	47.6
of which: Corn	(1.0)	(3.1)	(1.1)
Sugar-beets	29.4	7.9	4.7
Potatoes	0.9	5.2	4.2
Hay	12.4	12.6	3.6
Miscellaneous	<u>3.7</u>	<u>7.7</u>	<u>4.0</u>
Total	100.0	100.0	100.0

These figures show that already in 1928 the state farms were carrying on intensive sugar-beet culture, with a high percentage of the sown area devoted to sugar beets (29.4 per cent), and were assigning the chief place among their grain crops to the most valuable crop, winter wheat, and had brought the percentage of the sown area devoted to hay up to 12.4 per cent, thereby providing (together with by-products from the working-up of beets) a feed basis, mainly for fattening up beef cattle.

The collective farms, though not specializing in sugar-beets to such an extent as the state farms, devote a fairly high percentage of their sown area to winter wheat and hay.

The individual peasant farms are characterized by the fact that a large share of their sown area is devoted to rye, which constitutes a food crop for local consumption, and in general by less intensive farming, with a low percentage of hay and an insufficient quantity of feed for the development of animal husbandry.

The state farms and the small number of collective farms already established in 1927 were in no small way responsible, through the example they gave of proper agricultural methods, for that sudden advance which took place in the spring of 1930 in the matter of the collectivization of peasant households.

The opportunity afforded the Government to plan in a systematic manner the work of the collective farms, directed mainly toward an

increase in beet-sowings and their concentration in large tracts, would make possible by the end of the five-year period the following ratio of crops, as an average, in the wooded-steppe region: sugar-beets, 17 per cent; winter wheat, 29 per cent; corn, 5.9 per cent; hay, 7.4 per cent, and so on. The marketable output of this region in 1932-33 is expected to consist of: beets, 32.3 per cent; winter wheat, 28 per cent; animal products, 20.1 per cent. The central section of the wooded-steppe region, which specializes in hog-raising, will increase its share in the total marketable output of the region to 35.2 per cent.

Such, in brief outline, are the main lines of specialization in agriculture in the wooded-steppe region, one of the main regions of the Ukraine, which open up vast perspectives of intensive farming and improved well-being for the broad masses of peasantry united in collective farms.

VI. Winter Wheat and the Prospects for the Development of Grain Farming in the Steppe Region.

The Ukrainian steppe is the principal grain region, where the chief crop is wheat (mainly winter wheat), a crop having, as we have already pointed out, an all-union significance. The share of the different crops in the total sown area of this region in 1927 was as follows: rye, 16.4 per cent, winter wheat, 26.1 per cent; spring wheat, 18.2 per cent; corn, 6.9 per cent; sunflowers, 6.5 per cent; other grains, 20.6 per cent; crops other than grain, 21.7 per cent. Of the total marketable output grain constituted 71.5 per cent (winter wheat, 37.7 per cent) and animal products, 13.4 per cent.

In this region peasant farming is characterized by its extremely low technical level and by frequent lack of sufficient rainfall (or rather, by the uneven distribution of rainfall throughout the year), periodically suffering from drought. The sharp fluctuations in yield have also had their effect upon the development of animal husbandry, due to the curtailment in the feed supply. In general, animal husbandry has not had an opportunity to develop, due to the lack of feed under a system of extensive (non-intensive) agriculture.

The measures taken by the Government in its struggle against drought in this grain region have consisted in supplying the peasantry with selected drought-resistant seed (winter wheat), and with credits for the purchase of machinery, implements, etc. In addition, it has been recommended that there be introduced in the steppe region a socialized system of crop rotation, with so-called alternation of fallow and "row" crops, of the six-field type: early clean fallow, winter grain, spring grain, "row" crops (corn and sunflowers), winter grain, spring grain. In a number of localities in the steppe region the five-field system of crop rotation has been recommended: fallow, winter grain, "row" crops, winter grain, spring grain; and also a number of other crop rotations, often including alfalfa.

Early clean fallow has been widely adopted in the steppe region during recent years, inasmuch as the yield of winter wheat where this system of fallow is practised is consistently very high. In 1927 about 50 per cent of the total agricultural area of the steppe region, in accordance with the voluntary consent of the peasantry, was placed under the system of socialized crop rotation of the type indicated above. However, the crop rotation system was carried out only to the extent of about 50 or 60 per cent, since the peasantry (its poorest groups) did not possess the draft power to cultivate their plots properly. The small size of the peasant farms and the absence of a correct system of crop rotation resulted in the selected seed rapidly deteriorating, and hence not having the desired effect in the way of increased yield.

During the period 1925-1928 the average yield of winter wheat (7.9 centners per hectare) and of corn (10.5 centners per hectare) exceeded the pre-war level (6.7 and 10.0 centners per hectare, respectively), but the yield of other grains remained below the pre-war level. The destruction from winter kill of the crop of winter grain over a large area in 1928 and over a lesser area in 1929 considerably worsened the condition of peasant farming in the steppe region.

The introduction of the tractor in the steppe region, with its level fields, had a tremendous effect. The peasantry of the steppe region began to seek to increase the size of farms, to

utilize tractors, and to raise the technical level of farming, by means of organizing associations of various types: collective farms, machine-tractor stations (MTS), etc.

This explains the fact that the steppe region of the Ukraine is one of the oldest regions in the matter of collectivization. It was here that the idea of machine-tractor stations originated and was put into practice, an idea which has proved to be one of the most fruitful in the history of agriculture in the U.S.S.R. The machine-tractor stations soon revealed their superiority in the utilization of tractors in large-scale farming, proved of very great assistance to the collective farms, and set up an example of high productivity of labor. Thus, for instance, in the spring sowing campaign of 1930 a number of machine-tractor stations, which served collective farms under agreements, made it possible for even the poorest farms to sow all their land, whereas in preceding years, due to the lack of draft power, they had been forced to rent out a large share of their land, being able to sow with hired horses and implements only one or two hectares. The machine-tractor stations, moreover, plowed up enormous stretches of virgin soil and lands long left untilled, which could not have been plowed by the weak and inadequate horse draft power of the peasants. In many districts served by the machine-tractor stations the collective farms in 1930 increased their sown area from 30 to 40 per cent (the Krivoi Rog, Kherson, and other districts in the steppe region of the Ukraine).

The greatest successes in grain farming in the steppe region were attained by the state farms, which had specialized mainly in wheat since 1925. On the state farms of the steppe region by the end of 1928 tractors constituted 80 per cent of the draft power, and the yields attained were more stable and higher than the average for this region, the yield for winter wheat averaging 12-15 centners per hectare. In order to give an idea of the successes attained by the state farms as a result of specialization in grain farming, we shall describe, by way of example, the organization of one of the state grain farms of the Zernotrest (Grain Trust) in the southern arid part of the Ukraine (in Kherson district).

The Kherson state farm was organized in the spring of 1929 on lands left idle beyond the period allowed by law by settlers from the western over-populated agrarian section of the Ukraine, and also on the nationalized lands of the former landowners. The total area assigned to the state farm in the course of 1929 and 1930 amounted to 100,000 hectares of utilizable land. Of this area the state farm had by the spring of 1930 sown 40,000 hectares and had plowed over 15,000 hectares of fallow land, and expected by the fall of 1930 to utilize fully all its agricultural area. The state farm uses mechanical draft power exclusively (tractors, trucks, and light automobiles) and all sorts of agricultural machinery (including combines). In August of this year (1930) the state farm turned over to the state about 300,000 centners of grain of the best varieties.

The example of the state and collective farms played an important role in the rapid growth of collectivization in the steppe region in the spring of 1930. The great majority of the middle peasantry, having observed during the course of a number of years the successes of large-scale farming, became convinced not only of the superiority of the latter system but also of its greater profitableness and of the consequent higher income to be derived therefrom, and hastened to join the collective farms.

With further specialization of agriculture in the steppe region, as projected in the Five-Year Plan, the share to be taken by the various crops in the total sown area is estimated as follows: wheat (winter and spring), 35.7 per cent (a slight decrease in percentage, though the actual area will remain the same); corn, 22 per cent, as compared with 6.9 per cent in 1927; hay, to be increased to 5.5 per cent.

Such a reorganization of farm crops will make it possible to raise the share of winter wheat in the total marketable output to 43.5 per cent, and also to develop animal husbandry (in particular the production of cheese and butter), increasing the share of animal products (including poultry) in the total marketable output of the region to 25.2 per cent by the end of the five-year period.

The entire steppe region will thus become an important region of intensive grain farming, which in the western and central sections of the region will be combined with hog-raising, in the southern section with dairy farming, and in the eastern section with poultry raising.

The extreme southern portion of the steppe region (along the shores of the Black Sea) -- thanks to favorable conditions for the cultivation of cotton and other valuable semi-tropical crops, and also in connection with the proposed construction of immense irrigation works in the Dnieper River section (based on electric power from the Dnieper River power plant) -- will specialize in such semi-tropical crops, combined with fruit and vegetable growing and, to some extent, dairy farming.

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The above account of the main lines of specialization in agriculture in the Ukraine -- sugar beets and winter wheat -- reveals the vast perspectives which are opening up before agriculture in the Ukraine, which is one of the most advanced republics in the Union as regards agriculture.

The mechanization of agriculture, the employment of intensive methods, specialization in those branches of agriculture best adapted to the economic and physiographic conditions of the main regions of the Ukraine -- all this in the coming two or three years should change the face of Ukrainian agriculture, transforming it from a backward, extensive type to an advanced, highly intensive type.

However, it must be noted that the actual realization of these perspectives will be due largely to the rapid progress of collectivization and the transformation of the small, scattered, productively weak farms of the poor and middle peasantry into large collective farms.

The leading role in the successes of collectivization was taken, as has already been pointed out, by the practical example

proper methods of production afforded the entire peasantry by the experience of the state and collective farms. Preliminary data from a number of collective farms as to the results of the distribution of the harvest among the collective farm members show that -- after deducting all production expenditures, the 5 per cent of the gross output assigned for payment to the collective farm members for the property contributed to the socialized capital, and after the liquidation of the cash advances and of the interest due on credits received, and after small deductions for the maintenance of those unable to work and for cultural and educational needs -- the income per household in the collective amounts, on the average, to 600 rubles from grain alone, which ^{is} one and one-half to two times as high as the average net annual income of an individual peasant farm from all branches of agriculture. Moreover, it is necessary to keep in mind that the overwhelming majority of collective farm members, in addition to their work on the collective farm, also carry on individually certain non-socialized farming, principally animal husbandry (cows, hogs, poultry), which also provides some income. If earnings outside farming, such as those received as cab-drivers, are included, the average income of a collective farm member will come to 800 rubles per year. It is evident that, in measure that the collective farm movement develops and gains in strength, the well-being of the collective farm members will improve, which will strengthen the direct interest of the peasants in collective farms.

Thus, the path of development of large-scale state and collective farming, as has been demonstrated by the experience of the Ukraine, is the main path, proceeding along which we may count upon the full realization, based on a high level of technique and the specialization of agriculture, of the main goals of the Five-Year Plan for the reconstruction of agriculture outlined **above**.
