

# The beginning of virgin lands development in Pavlodar region (in 1954)

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**Abstract.** The article focuses on the initial stage of the virgin and fallow lands development in Pavlodar region. The authors elaborated on the climatic features of the region, noting that this territory was characterized by complex natural and climatic zones and had huge deposits of minerals. The climate in north-eastern Kazakhstan was sharply continental, arid, and the soils were mostly unsuitable for farming, so the cultivation of grain crops was fraught with huge risks and difficulties. The authors conclude that, despite the natural, climatic and other difficulties encountered, the virgin land development activities were completed successfully and in the first years the sown area of grain crops in the Pavlodar region was significantly increased.

## 1 Introduction

Undoubtedly, the virgin lands campaign of the Khrushchev decade was controversial. On the one hand, the goal set by the Soviet leadership to resolve the issue of an acute crisis in grain production was not achieved. On the other hand, N.S. Khrushchev's agricultural reforms had positive results concerning both the agricultural and other sectors of the economy [1–12]. During the years of virgin and fallow lands development, Pavlodar region of the Kazakh SSR became one of the regions for the production of high-quality hard grain. For this purpose, numerous scientific expeditions were sent to the region to search for suitable lands for mass ploughing for virgin lands.

## 2 Materials and Methods

The article is based on a set of research methods, both special and general scientific ones. The scientific methods of the study include the general principles of objectivity and scientific character. The paper applies a number of methods typical of this kind of research, i.e., chronological method, retrospective method, problem method. In general, the presented article is the result of an interdisciplinary study, since in the process of working on it, the authors used the methods of different disciplines, i.e., history, agronomy and ecology.

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During the analysis of statistical materials, the authors emphasise the method of critical verification of various sources on the history of the virgin campaign in Pavlodar region in the 1950s.

### 3 Discussion of the results

#### 3.1 Climate

Pavlodar region was separated from East Kazakhstan region in 1938. It is located in the north-eastern part of Kazakhstan, bordered by Omsk and Novosibirsk regions to the northeast, Kulunda steppes of Altai Krai to the east, Semipalatinsk and Karaganda regions to the south and Akmola region to the west. The region possesses vast natural resources, which began to be studied systematically in the early years of the establishment of Soviet power. In 1940–1950s industry was rapidly developing in the region: a number of light and heavy industry enterprises were founded, such as chrome and milk cannery, “Glavmuka” enterprise, and meat processing factory. The products of these enterprises, such as household goods, milk powder, flour, meat products were exported outside the region. In the 1950s, before the development of virgin and fallow lands, there were two mechanical-repair plants, which served the growing agriculture of the region with the necessary spare parts, components and other agricultural equipment.

In the first years of the virgin lands development the salt industry was further developed. During the virgin land campaign new salt mining and processing enterprises, such as “Tavolzhsol”, “Kalkamansol” and others, grew up on the basis of small scattered salt mines. Pavlodar salt was supplied to almost all Western Siberia [13].

The South Siberian railway, which was put into permanent operation in 1954, crossed the main industrial areas of the region and determined the development of the national economy, especially industry. During the development of virgin lands geologists explored and found large deposits of coal, gold, copper, refractory clay and a number of other minerals necessary for agriculture.

In general, it should be noted that the economy of the region has developed dynamically since its foundation, which was one of the reasons why Pavlodar became one of the centres for the development of virgin and fallow lands.

#### 3.2 Pavlodar region during the development of virgin lands

In the years of virgin lands development there were 184 collective farms (serviced by 32 MTS), 61 state farms, of which 32 state farms were organized in 1954–1955. Among 32 new state farms 4 state farms were organized in spring 1954: Kuibyshevskiy, Leninskiy, Abayevskiy and 19 party congress. State farms of the region were distributed as follows: 39 grain farms, 13 dairy and meat farms, and 9 sheep farms. However, in spite of their major specialisation, state farms were multi-branch farms. By the end of 1954 the land area of all state farms of the region was 3067604 ha, including: ploughland – 599503 ha, flood and dry grassland – 145851 ha, pastures – 616728 ha, homestead – 6303 ha, orchards and berries – 59 ha, shelterbelt forests – 486 ha, ponds and reservoirs – 73264 ha and other unused land – 625410 ha [14].

#### 3.3 Climatic features of the region

The location of the region in the interior of the continent in the northern zone of dry steppes largely determined the character of its climate and soils. A common feature throughout the

region is the low amount of precipitation, unevenly falling in some periods of the year, hot summers with low relative humidity during the day, and long, harsh winters with little snow and strong winds and snowstorms.

The average annual precipitation is 220–300 mm, varying in some years from 77 mm (1940) to 455 mm. (in 1938). The average annual air temperature is +2.3 degrees, the maximum in July to +41 degrees, the minimum in December or February to -40 degrees. Daytime humidity in winter is 75-80%, in spring and summer 35–40%. In May and June, the relative humidity often drops to 14%, and in some years to 7%, when there were particularly strong dry winds, which caused great damage to crops.

A characteristic feature of the agroclimatic conditions of the region was the rapid increase in temperature in spring, increased moisture evaporation and stormy winds in the first half of summer, which caused wind erosion of sprayed soils and the phenomena of so-called “black storms”, which according to observations were repeated up to 20–80 times per year.

The main climatic conditions that had to be taken into account were the distribution of precipitation at different times of the year, the timing of spring and autumn frosts and the duration of the frost-free period.

Throughout the region, almost 42% of precipitation fell during the summer months (mainly in the second half of summer from 20 to 25 August), i.e. during the most intensive growth, filling and ripening of grain. The remaining 58% fell irregularly in spring and autumn, as can be seen from the following multi-year data [15]. Table 1.

**Table 1.** Amount of precipitation per year.

<b>spring</b>	<b>summer</b>	<b>autumn</b>	<b>winter</b>
19.6%	41.7%	27.7%	11.0%

In some years, there were deviations in the distribution of precipitation, when it fell evenly throughout the growing season (1940) or was concentrated in the first half of the summer and the second half was accompanied by drought (1948).

Frosts ceased in the second half of May, but in some years in the northern zone they were possible until mid-June. The first destructive autumn frosts usually appeared at the end of the first and beginning of the second decade of September. The average duration of the summer frost-free period was 100–135 days, with a maximum of 144 days in the southern zone [16].

The aridity of the spring period, the concentration of most precipitation in the second half of the summer and the relatively early occurrence of the first autumn frosts, especially in the northern zone and in the Bayan-Aul mountain-foothill microregion, required extensive use of snow retention on the fields and compressed spring sowing dates.

Using the power of winter winds that transported snow over long distances, the region had unlimited opportunities to accumulate heavy snow cover on the fields. With the help of high-stemmed plants and the use of other effective snow retention methods, it was planned to cover the plants' moisture needs throughout the first half of the summer and, combined with the precipitation in the second half of the summer, and to produce sustainable high yields.

Almost the entire region was within one soil vegetation zone of sedge steppes on dark chestnut soils, and only the northern part (Irtyskiy, Urlyutyubskiy districts) entered the zone of chernozem steppes, and the southern part (Mayskiy district) entered the zone of desert wormwood steppe and light chestnut soils. Northern Kazakhstan is among the world's priority ecological regions. It has a diverse landscape and unique flora and fauna, which is generally characteristic of the whole of Central Asia [17].

The region's territory was mostly open steppe. The tranquil and flat character of the region's relief favoured extensive mechanisation of all field work and the use of tillage,

sowing and harvesting machines and aggregates. Only in the territory of Bayan-Aulskiy and part of Mayskiy districts, the flat terrain transitioned to a shallow topography and a mountain ridge in the centre of Bayan-Aulskiy district.

The main and only major river in the region was the Irtysh River. Its floodplain was 3 to 8 kilometres wide, reaching 12 kilometres in some places. The river crossed the whole area of the region from south-east to north-west. The Irtysh River and its floodplain, riddled with many islands, small lakes, tributaries and streams, with good herbage of mixed grasses, provided a significant number of collective and state farms with drinking water, hay and timber. The waters of the Irtysh provided great opportunities for irrigation of vegetable and other crops, but this opportunity was used to a very limited extent. The Irtysh was rich in fish of valuable sturgeons and common fresh water fish species.

In the eastern part of the region, in the territory of Kuibyshev and Bayan-Aul districts, steppe rivers Chiderty, Ulenty and in the central part of Bayan-Aul district Ashi-Su flowed. These rivers were characterised by abrupt, short and high spring floods. Most bodies of water dried up in the summer and gradually became saline. The waters of these rivers were used for flood irrigation of hayfields and pastures by collective and state farms of the adjacent districts.

There are many lakes in the region, most of them saline. The drinking water needs of the population and livestock farming in areas far from the Irtysh River were met mainly by wells, with sufficient inflows of good quality water to allow the use of mechanized water supply to livestock farms for watering and irrigation of vegetable crops.

### 3.4 Peculiarities of the soil layer of Pavlodar region

The soil cover of the region is rather complex. In the northern zone (Irtyshskiy, Urlyutyubskiy, Mikhailovskiy, Northern and north-eastern part of Maksimo-Gorkovskiy area) the southern clayey degraded chernozems of medium thickness, in complex with solonetzic spots prevailed. Vegetation on virgin lands and hayfields is represented by rather dense motley grass.

This zone, with the exception of the Irtysh steppe region, was a typical forest-steppe with scattered birch rings.

In the central and southern parts of the region the main soil cover is represented by sandy dark chestnut, partly light loam varieties, with patches of dark-coloured salt-affected soils in depressed areas and a significant spread of solonetzic spots, with loose herbage of typical steppe formation, dominated by feather grass, saltwort and sea wormwood.

As one approached the Irtysh River and a strip of ribbon pine forest, which is located in the Galkinskiy, Lebyazhinskiy and Beskaragayskiy districts, the provision increased.

On the left bank of the Irtysh river, on the territory of the Kaganovich, Mayskiy and Bayan-Aul districts, along with light loamy and sandy slightly saline dark-chestnut varieties, there are cartilaginous loamy, light loamy and sandy dark-chestnut and partly light-chestnut carbonate and solonetzic soils, with exposure to the surface of rocks in Bayan-Aulskiy and in the western part of Mayskiy districts.

A common feature of soils in the central and southern parts of the region was their light spreading and the presence of a highly compacted subsoil layer at a depth of 18–20 centimetres, and in some places as much as 16 centimetres.

The region's soil and climatic conditions made it possible to successfully cultivate spring wheat, especially valuable varieties of hard wheat, millet, grain forage, buckwheat, maize and a number of other cereals and leguminous crops. Annual grasses (mohar, Sudanese grass, etc.) produced high yields. A great variety of vegetables, potatoes, watermelons and other melons grew well. The conditions of the area also allowed for extensive fruit and berry gardening.

The region had an area of 135800 square kilometres. There were 184 collective farms with a total land area of 4795.4 thousand hectares, of which 2394.2 thousand hectares were arable land, and 61 state farms [18].

The sown area in the collective farms of Pavlodar region in 1954 significantly increased compared to 1953 and previous years, as can be seen from the following data (in thousands of hectares). See Table 2.

**Table 2.** The size of the sowing area.

Crops	1954	1953	1950
All sowing area	805.7	622.7	508.0
Including spring ones	753.1	562.1	480.3
Grains	636.8	495.7	438.4
Spring wheat	395.0	310.8	279.8
Millet	145.5	105.2	75.6
Oilseeds	41.9	36.7	29.2
Total of fodder	100.0	69.4	14.0
Including annual grass	32.2	5.1	6.2
Silage	17.1	9.9	2.6

Thus, the area sown in 1954 increased by 29% compared to 1953, including spring crops by 34%, cereals by 28%, of which wheat by 27%, millet by 38%, fodder crops by 44%, including annual grass by 531% and silage by 73%.

The entire land area of the region of 13358.4 thousand ha has been distributed among the main categories of land users as follows. See Table 3.

**Table 3.** Land fund of the region.

Total	Collective Farms	State Farms	State Fund	Forest Fund	Other
13588.4	4795.4	3067.6	3804.0	712.7	1203.8
100.0%	35.3%	22.8%	30.0%	3.9%	9.0%

The plan for the development of new lands for 1954 – virgin lands and fallow lands, was established on an area of 750.0 thousand hectares, of which 650.0 thousand hectares for the collective farm sector and 100.0 thousand hectares for state farms. Since the nature of the virgin campaign was of an emergency nature, in fact, these works were carried out on an area of 1094.1 thousand hectares, including by districts and sectors in the following sizes [19]. See Table 4.

**Table 4.** Development of virgin and fallow lands in 1954 (thousand hectares).

No	Name of districts	Collective farms		state farms		total	
		plan	done	plan	done	plan	done
1	Bayan-Aul	5.0	13.6	–	–	5.0	13.6
2	Beskaragai	60.0	86.6	–	–	60.0	86.6
3	Galkinsky	45.0	75.2	–	–	45.0	75.2
4	Irtyskiy	80.0	87.9	45.0	67.9	125.0	155.8
5	Kaganovichskiy	25.0	39.3	20.0	38.7	45.0	73.0
6	Kuibyshevskiy	30.0	48.7	6.5	24.1	36.5	72.8
7	Lebyazhinskiy	10.0	19.3	2.5	8.7	12.5	28.0
8	Lozovskiy	95.0	133.5	–	–	95.0	133.5
9	M-Gorkovskiy	50.0	88.4	4.5	15.5	54.5	103.9
10	Mayskiy	5.0	12.8	1.0	2.9	6.0	15.7
11	Mikhailovskiy	35.0	44.4	14.3	14.0	43.0	58.8
12	Pavlodarskiy	80.0	10.7	4.5	14.9	84.5	122.3

13	Urlutyubskiy	55.0	65.9	2.0	8.3	57.0	74.2
14	Tsyurupinskiy	75.0	80.8	–	–	75.0	80.8
	Total	650.0	903.8	100.0	190.0	750.0	1094.1

Of these, 255 thousand hectares were developed on collective farms for spring sowing, with a plan of 60 thousand hectares, while in 1953 only 59.9 thousand hectares of virgin lands were developed, and for the period from 1949 to 1953 – 248 thousand hectares. Thus, in 1954, the region's collective farms developed 3.7 times more virgin and fallow lands than in the previous five years.

As a result, already in 1954 184.5 thousand hectares more grain crops were sown in the collective farms on virgin and old-developed lands as compared to 1953, and in 1955, 1040 thousand hectares of crops were sown in the collective farms only on the newly-developed virgin and fallow lands and turnover of those lands.

Along with a sharp increase in the amount of work done to bring new fertile land into agricultural turnover, as compared with previous years, great attention was paid to improving the level of preparation and use of agricultural technology. Deep ploughing with ploughshares was carried out on the whole area of spring ploughing, fallow and seedbed of virgin and fallow lands. On heavily contaminated soils, pre-ploughing and disking of the layer after ploughing were applied.

On significant areas of spring ploughing of virgin and fallow lands the soil was rolled by smooth water-roller and ring rollers. This new measure for the region in the pre-sowing preparation of the virgin lands gave an increase in the yield of spring wheat from 2 to 3 quintals and millet 2–4 quintals per hectare. In addition, a number of other agronomic measures and advanced crop cultivation techniques were applied at that time: snow retention on an area of 178.1 thousand hectares, including the high-stemmed shrubbery on 28.3 thousand hectares, air-heated seed heating on 260.3 thousand hectares, intercropping and narrow-row sowing methods on an area of 20 thousand hectares square-breeding and square sowing and planting of row crops, vegetable crops and potatoes – 9.8 thousand hectares, application of phosphorobacterin on the area of 11.2 thousand hectares, planting of vegetable crops in humus and earth pots – 889 thousand pieces [20].

For the first time, phosphorobacterin was applied to wheat on 11.9 thousand hectares of virgin land in collective farms in the region. According to official reports, the yield increase on these crops was 2.0–4.0 quintals per hectare. In a similar range, an additional 13.9 thousand hectares of virgin land were harvested using the intercropping and narrow-row method.

In 1954, on the collective farms of the region for the first time, production experiments with no-tillage were set up, arising from the system developed by the scholar T.S. Maltsev. In the Chkalov collective farm of Irtysk district on the area of 240 ha by subsurface autumn loosening of fallow on 35 cm yielded 31,8 centners of cleaned spring wheat grain per hectare on average. In Beskaragai collective farm 15th anniversary of Kazakhstan on 320 hectares of non-mouldboard autumn ripping of fallow soft ground yield of spring wheat was 22,7–24,0 quintals per hectare, against 15,0–19,3 quintals per hectare on control plots of fallow conventional treatment [21].

## 4 Conclusion

In the 1950s, Pavlodar region became one of the centres for ploughing virgin and fallow lands. Difficult natural and climatic conditions complicated the work on the development of the territory of the region. Despite the difficulties, measures were taken to accelerate the development of land masses in the region. For this purpose, in 1954 alone, 3.7 times more land was ploughed than in previous years. Collective farms and state farms used methods of non-mouldboard tillage, the use of phosphorobacterin, soil compaction with smooth water-

filled and ringed rollers, which made it possible to temporarily improve soil characteristics [21].

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