Efficiency of using agricultural land in the context of natural and economic zones of the Krasnodar Kari in order to involve them into circulation

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Abstract. The efficiency of using agricultural land in the context of natural and economic zones of the Krasnodar Krai in order to involve them into circulation is studied in this paper. It is analyzed that the productive properties of the land directly depend on the fertility of the soil, which is characterized by soil types, humus reserves, mechanical composition and other indicators. Soil fertility was assessed, the indicator of which is the bonitet score.

1 Introduction

The Krasnodar Krai is famous for its fertile lands, but it must be remembered that the lands of the municipalities of the Kraisomehow differ in quality. Consequently, the efficiency of agricultural production in individual regions will differ from each other.

In order to determine the efficiency of the use of agricultural land by municipalities of the Krasnodar Krai, taking into account the productive properties of land in the context of natural and economic zones, we will find, for a start, the average soil score for each municipal formation in the context of agricultural zones. There are six such zones in the region: Northern, Central, Western, Anapo-Taman, South-Piedmont, and Black Sea.

2 Materials and methods

From the materials of the assessment of the lands of the Krasnodar Krai (initial indicators of soil fertility) in 1990, we write down the soil scores of dry arableland and irrigated arableland in Table 1 by municipalities and group them by zones [1].

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Table 1. Scores of bonitet of arable land by municipalities of Krasnodar Krai by zones.

Municipalities	Bonitet scores	
	dry arable land	irrigated arable land
Northern zone		
Beloglinsky	72	-
Yeysky	76	-
Kanevsky	79	80
Krylovsky	75	72
Kushchevsky	75	-
Leningradsky	80	78
Novopokrovsky	76	81
Pavlovsky	80	79
Starominskiy	74	74
Tikhoretsky	81	80
Shcherbinovsky	73	74
Central zone		
Bryukhovetsky	83	83
Vyselkovsky	84	84
Gulkevichsky	83	68
Dinskoy	81	81
Kavkazsky	82	82
Korenovsky	85	85
Kurganinsky	83	67
Novokubansky	82	65
Primorsko-Akhtarsky	82	78
Tbilissky	79	75
Timashevsky	84	85
Ust-Labinsky	81	77
Armavir	77	74
Krasnodar	78	75
Western zone		
Kalininsky	78	66
Krasnoarmeyskiy	66	57
Slavyansky	49	39
Anapo - Taman zone		
Temryuksy	47	29
Anapa	56	40
South-Piedmont zone		
Abinsky	58	51
Absheronsky	48	54
Belorechensky	61	59
Crimean	57	40
Labinsky	82	65
Mostovsky	66	56
Otradnensky	83	-
Seversky	54	53
Uspensky	74	75
GoryachyKlyuch	52	50
Black Sea zone		
Tuapsinsky	51	47
Gelendzhik	46	46
Novorossiysk	58	59
Sochi	42	45

From table 1, it can be noted that the soil score of dry and irrigated arable land differs among themselves depending on the municipality, with the exception of Bryukhovetsky, Vyselkovsky, Dinsky, Kavkazsky, Korenovsky, which are located in the Central zone, and Starominsky district, as well as the city of Gelendzhik. In these municipalities, the soil score of dry and irrigated arable land is the same. In such areas as: Beloglinsky, Yeysky, Kushchevsky and Otradnensky, there is no irrigated arable land, these areas are included in the Northern zone of the region.

In the report on the availability and distribution of lands in the Krasnodar Krai, we took information on the area of all arable land and the area of irrigated arable land. The area of dry arable land was found as the difference between the area of all arable land and the area of irrigated arable land [2].

All data on municipalities and areas by zones are shown in Table 2.

Table 2. Information on arable land areas by municipalities of the Krasnodar Krai by zones, hectares.

Municipalities	Stotal arable land	S irrigated arable land	Sdry arable land
Northern zone			
Beloglinsky	128308	-	128308
Yeysky	143691	-	143691
Kanevsky	177018	7086	169932
Krylovsky	114587	1397	113190
Kushchevsky	197930	-	197930
Leningradsky	109803	5127	104676
Novopokrovsky	179209	8526	170683
Pavlovsky	146676	3682	142994
Starominskiy	80877	1170	79707
Tikhoretsky	140348	7105	133243
Shcherbinovsky	105448	931	104517
Central zone			
Bryukhovetsky	102057	5650	96407
Vyselkovsky	140913	5359	135554
Gulkevichsky	100995	6175	94820
Dinskoy	83188	14775	68413
Kavkazsky	89870	9130	80740
Korenovsky	113038	6323	106715
Kurganinsky	111599	9737	101862
Novokubansky	138428	2832	135596
Primorsko-Akhtarsky	78229	4808	73421
Tbilissky	108834	12098	96736
Timashevsky	116564	5909	110655
Ust-Labinsky	15207	2641	12566
Armavir	40927	12944	27983
Krasnodar	40927	12944	27983
Western zone			
Kalininsky	96215	34309	61906
Krasnoarmeyskiy	129837	89741	40096
Slavyansky	109103	82467	26636
Anapo - Taman zone			
Temryuksy	55017	14476	40541
Anapa	31986	2611	29375
South-Piedmont zone			
Abinsky	52162	27653	24509
Absheronksy	7188	465	6723

Belorechensky	62008	8310	53698
Crimean	61747	24879	36868
Labinsky	100091	2096	97995
Mostovsky	50638	373	50265
Otradnensky	99301	-	99301
Seversky	49071	9817	39254
Uspensky	54052	744	53308
GoryachyKlyuch	21111	678	20433
Black Sea zone			
Tuapsinsky	1247	54	1193
Gelendzhik	90	88	2
Novorossiysk	9073	1156	7917
Sochi	3468	1063	2405

From the information given in Tables 1 and 2, we find the average bonitet of arable land in the municipalities of the region in the context of zones according to formula 1:

$$B_{av} = \frac{B_{dry} * S_{dry} + B_{irr} * S_{irr}}{S_{total \text{ arable land}}}, \quad (1)$$

where B_{dry} – dry arable land soil score;

S_{dry} – dry arable land area, ha;

B_{irr} – soil score of irrigated arable land;

S_{irr} – irrigated arable land area, ha;

S_{total} – total arable land area, ha.

Let's calculate the average bonitet scores of arable land for all municipalities of the Krasnodar Krai according to formula 1 and group them by zones. Let's write the obtained results in Table 3.

Table 3. Average scores of bonitet of arable land by municipalities of the Krasnodar Krai by zones.

Municipalities	Scores
Northern zone	
Beloglinsky	72
Yeysky	76
Kanevsky	79
Krylovsky	75
Kushchevsky	75
Leningradsky	80
Novopokrovsky	76
Pavlovsky	80
Starominskiy	74
Tikhoretsky	81
Shcherbinovsky	73
Central zone	
Bryukhovetsky	83
Vyselkovsky	84
Gulkevichsky	82
Dinskoy	81
Kavkazsky	82
Korenovsky	85
Kurganinsky	82
Novokubansky	82
Primorsko-Akhtarsky	82
Tbilissky	79

Timashevsky	84
Ust-Labinsky	81
Armavir	76
Krasnodar	77
Western zone	
Kalininsky	74
Krasnoarmeyskiy	60
Slavyansky	41
Anapo - Taman zone	
Temryuksy	42
Anapa	55
South-Piedmont zone	
Abinsky	54
Absheronksy	48
Belorechensky	60
Crimean	50
Labinsky	82
Mostovsky	66
Otradnensky	83
Seversky	54
Uspensky	74
GoryachyKlyuch	52
Black Sea zone	
Tuapsinsky	51
Gelendzhik	46
Novorossiysk	58
Sochi	43

3 Results

As a result of our survey, the most fertile regions were: Bryukhovetsky, Vyselkovsky, Gulkevichsky, Kavkazsky, Korenovsky, Kurganinsky, Labinsky, Leningradsky, Novokubansky, Otradnensky, Primorsko-Akhtarsky, Pavlovsky, Timashevsky, Tikhoretsky and Ust-Labinsky. Their soil score was above 80. All these areas are located in the Central and Northern zones of the region.

Less fertile areas and cities with a bonitet score less than 55 are: Apsheronsky, Crimean, Seversky, Slavyansky, and Temryuksy; the city of Anapa, Gelendzhik, GoryachyKlyuch, and Sochi.

4 Conclusions

The above data in the tables clearly show that the assessment scores for the municipalities of the region are quite high. Therefore, this allows concluding about the fertility of the land.

In our opinion, it is imperative to take into account the fertility of agricultural land in the Krasnodar Krai, since this will give an impetus to the functioning and development of the agricultural land market and, accordingly, the country's economy as a whole.

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