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Comprehensive Approach for Evaluating the Potential of the Stavropol Agricultural Territory

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ABSTRACT

The provision of food security in Russia under conditions of the World Trade Organization and the Customs Union, the food import embargo and sanctions is a complex and multiscale task for supplying industry with the agricultural raw materials and the population with foodstuffs on stable basis and for achieving relative independence from the imports of raw materials and food products. Currently, the agribusiness in the Stavropol Territory is developing faster than the agriculture in the neighboring regions of the North Caucasus Federal District. An analysis of the diversity of natural and socio-economic conditions in this territory has shown that the existing areas of agricultural specialization do not correspond to the potential of the territory and the food security in general. With the reduction of the state financial support, an increase in the number of unprofitable farms has been marked. The structure of the foodstuff manufacturing (potatoes, fruits, milk, and meat) is increasingly drawn to the small-scale farms. The consequence of the land and economic reforms becomes the imbalance structure of agricultural lands, livestock population, crop acreages and rotations, deterioration of soil fertility indices in large and medium agricultural enterprises. The low yielding natural forage grassland are prevailing. A biologically simplified system of farming has been formed, which leads to a short-term economic effect on the background of the phytosanitary and agrochemical sustainability drop of tillable lands and to the deterioration of the natural environment state. The production and yield of agricultural crops is increasingly dependent on weather conditions. This is unacceptable for the recovery of livestock production and effective arable farming. In accordance with the implementation of the "Strategy of Socio-Economic Development of the North Caucasus Federal District until 2025," the Stavropol Territory in the future will continue focusing on the development of agribusiness. The main tasks of the agricultural production of enterprises should be as follows: The correction of specialization and location of livestock production in view of the natural resource base of the landscape; the increase in the share of green fodders from pastures and hayfields; the use of farming technologies adaptive to the climatic conditions that enhance the productivity of agricultural lands and efficiency of the spent material and technical resources; the conservation of degraded agricultural lands followed by grassing, etc. Such an approach will, on the one hand, prevent the manifestation of the adverse natural processes, and, on the other, ensure the environmental sustainability of the territory and the dynamic development of agribusiness, the economic competitiveness of the Russian market and the possibility of import substitution.

Keywords: Agriculture, Land Fund, Yield, Agricultural Lands, Agricultural Zones

JEL Classifications: F51, Q11, Q13, Q16, Q18, R14

1. INTRODUCTION

In modern conditions, the existing system of the agricultural lands management of the Stavropol Territory is unable to provide a

significant increase in the volume of agricultural production and increase in the stability and efficiency of agricultural production. To make the right strategic decisions on a rational spatial organization of the territory it is necessary to comprehensively and in details

assess its potential (eco-landscape, agroecological, territorial, and industrial) for the development of the agribusiness capacities, the sustainability of agricultural landscapes and agricultural lands management as a whole (Isachenko and Isachenko, 1995).

2. METHODOLOGY

The application of an comprehensive approach (ecological and landscape-based, agro-ecological, territorial, and manufacturing) allows us to fully take into account the terms of the spatial organization of farming production and natural resource management, the level of administrative-territorial and agro-zonal division.

The problem of improving the organizational and spatial structure of agrarian land management today has become particularly urgent in connection with the adoption of the concept of sustainable development. The sustainable land management should take into account more fully the properties and features of the landscape and the suitability of the economic territory. During the land management it is rational to use an ecological and landscape approach in conjunction with an agro-environmental one. The landscape design begins with a landscape zoning and ends with the formation of environmentally homogeneous regions, to which the system of farming and soil management, environmental objects and events are tied. As a result of the ecological and landscape organization of the territory, the production costs of natural resources and the cost of agricultural production are minimized, and its quality and competitiveness of an enterprise are increased.

An agro-ecological approach is the study of agro-ecological characteristics of the territory in relation to certain types or groups of agricultural crops and selection of the agro-ecologically similar land masses as the basis for designing agrocoenosis. The end result is the formation of a basis for binding a system of farming, placement of crop rotations, fields, work areas, etc.

The use of territorial and productive approaches allows us to determine the current trends of socioeconomic and environmental development of agricultural land management for the formation of its development strategy.

This integrated approach allows for consideration of the environmental, social, and economic potential of the land tenure, for binding the system of agricultural production management to land, and for determining its prospects. Land management is becoming an essential tool for the differential use of local natural resources, peculiar features of farming, and cultivation of agricultural crops. At land management of an agricultural enterprise, the territorial organization and location of the farm's production facilities, its branches as well as the territorial organization of production processes with the placement of the infrastructure elements are carried out. In this case, the land tenure can be regarded as an integral, interrelated set of design elements that need to be organized in accordance with the environmental principles. The project, as a final product of land management, allows us to optimally link the economy, the organization and the production technology, the land arrangement taking into

account the local environmental conditions, and the territorial characteristics of land and agro-ecological potential.

2.1. The Ecological and Landscape Potential of the Territory

The Stavropol Territory includes within its borders the Ciscaucasia plains and mountains of the Greater Caucasus. The plains are divided into the following provinces: Forest-steppe, steppe and semi-desert landscapes (Kagermazov, 2000).

The area of the forest-steppe landscape province is 10,122 km². The climate is temperate continental. The relief is dominated by the plateau-like high plains deeply dissected by river valleys. The mixed herb-grasses steppes, upland and ravine forests are widespread. The high floristic richness of forest-steppes makes 60-100 or more species per 100 m². The well environment simulating functions of the territory and the rich natural resources (black soils, forests, groundwater, mixed grass steppes, and the natural-reserved fund) created good conditions for the agricultural activities. The agricultural development of the territory makes 92%.

The area of the steppe landscape province makes 25,310 km². The terrain is dominated by the erosion-accumulative plains. The climate of the province is more continental. In floristic diversity, the steppes are one of the richest among the herbaceous communities in Russia (Kas'ianov, 1998). The floristic richness of a meadow steppe makes 91 species per 100 m². The projective coverage of the phytocenoses of good preservation is 70-100%, of the downed pastures – 35-40%. The territory is ploughed by 94%.

The area of the semi-desert landscape province is 24,246 km². The terrain is dominated by the low-lying plains. The climatic conditions are distinct in continentality and aridity. The pastures of dry steppes and semi-deserts are common for the following types of soil: Light chestnut soil, chestnut soil, solonetzic soil, solonchak soil, and shifting sands. The sagebrush-grass steppes were used in the agriculture activity as the natural grasslands for grazing sheep – The feather grass-fescue steppes, the grass-sagebrush and thistle complexes with an estimated coverage of grass stand from 30% to 70% of the soil surface, with floristic richness of 18-51 species per 100 m² (Kas'ianov, 2000). Due to many years of grazing sheep on pastures, the virgin grasses have given way to poisonous and harmful weeds. The downed-like nature of pastures (up to 70%) restricts the ability to increase sheep population. The territory is ploughed by 95%.

The piedmont landscapes of the Greater Caucasus are presented by the province of the piedmont steppe and forest-steppe landscapes and of the mid-mountain ones. The area of this province is 6740 km². The terrain is dominated by the sloping terraced plains. The climate is moderately humid. In the fodder production, the significant position is occupied by the natural grasslands: The availability of the meadow and herb bunchgrass steppes rich in their floristic composition and yield capacity. The grazing of bovine cattle and sheep is carried out for 7-8 months a year. The livestock production has the lowest cost value. Here, the cattle and sheep breeding can develop efficiently with a minuscule

proportion of pig farming. The agricultural development of the territory makes 80% (Kiriushin et al., 2005).

Thus, according to the degree of downed-like nature, the grasslands of the Stavropol Territory are in poor condition (Kiriushin, 2010). The uncontrolled grazing of cattle and the active economic activity led to the severe degradation of the vegetation cover and to the significant reduction in species diversity. The grass stand lost the legumes that were the most valuable in their forage nature, as well as some of the plants from the group of motley grasses (15-20%); and the number of species declined from 35-40 to 5-9. An average pasture productivity has reached a critical level of 0.4-3.0 hwt/ha of fodder units. In order to rationalize the grassland farming, it is suggested as follows:

1. Bringing the livestock inventory in conformity with the soil-feeding capacity of pastures
2. Determining the optimal term to start and end the grazing season
3. Reserving a part of the area in case of winter grazing (wormwood communities of the semi-desert landscapes)
4. Replacing the much downed pastures
5. Planning the harvest of cultural (varietal) herbs on the bogharic and irrigated lands.

3. RESULTS

In the Stavropol Territory, there are six agroecological groups of lands in accordance with the character of natural constraints of land suitability for growing crops or their groups and with the activities for overcoming them.

The first agroecological group of lands includes the territories of the most of farms within the region having tillable land and the appraisal by points being above the average district level (the especially valuable agricultural lands). This group includes all subtypes of the black, chestnut, meadow-black, and meadow-chestnut soils. The land area amounts to 2169.8 thousand ha. In this area, the maximum intensification of production is possible (Kiriushin, 2011).

The second agroecological group of lands includes the lands within the farms of the region with the appraisal by points being less than or close to the average district level. This group includes all subtypes of the black, chestnut, meadow-black, and meadow-chestnut soils, but with the presence of negative features (slightly eroded, subsaline, and fairly stony-rubble lands). The land area is 1121.2 thousand ha. In this territory, a moderate intensification of production is possible. The territory is suitable for cultivating the less demanding agricultural crops and should be included into the system of fodder crop rotations (Grebennikov, 2014; Antipov and Drozdov, 2002).

The third group consists of the land parcels subject to the wind, water, and joint erosions of an average degree. A set of cultivated cultures is limited. The transfer of a part of the land into different category is not appropriate. It is recommended to apply the soil conservation systems of cropping. The land area amounts to 447.2 thousand ha.

The fourth group of lands consists of the plots of tillable land with a high degree of degradation. It is recommended to change the designation purpose of a number of lands since their territory is not suitable for the cultivation of field crops. The land area amounts to 174.5 thousand ha.

The fifth agroecological group includes the lands with a high degree of degradation that have lost more than 50% of the capacity of the soil profile (A + B). These land parcels are not suitable for the cultivation of agricultural crops and therefore are subject to the withdrawal from the structure of agricultural lands followed by the conservation. The land area amounts to 46.1 thousand ha.

The sixth agroecological group of lands includes the areas of bogharic and irrigated tillable lands subject to waterlogging and secondary salinization. In these territories, it is necessary to conduct land reclamation, agroforestry improvement, and other measures for eliminating the excessive waterlogging, desalinization, etc. (Luk'ianchikov, 2007). The lands are to be transferred to the stage of reclamative construction. The land area amounts to 22.3 thousand ha.

3.1. The Production Potential of the Territory

Currently, the Stavropol Territory possesses a developed agriculture. The fine-wool sheep breeding and grain crops are the main branches of the specialization. The share of food grains exceeds 80%. At the same time, it should be noted that about a half of the grain produced is used for the on-farm purposes. The value of the grain industry of the agriculture is determined by the participation of the territory in the creation of food security in Russia. The share of the crop farming production is 61.7%, livestock – 38.3%. The Stavropol Territory produces 7.3% of grain, 5% of sunflower, 4.4% of sugar beet, 1.9% of milk, 2.9% of meat, and 2.1% of eggs from the total Russian volume. Among the regions of Russia, this territory occupies the second place in grain production after the Krasnodar Territory (Nikolaev et al., 2002).

In the Stavropol Territory, 565 agricultural organizations and 12.5 thousand peasant (farming) enterprises (PFE) are operating. From 2000 to 2012, the number and size of PFE were constantly increasing: From 14,675 (the year 2000) to 15,047 units (the year 2012), and from 37.2 to 43.2 ha, and the number of companies and organizations reduced. As a result of the production and financial performance in 2008, the share of loss-making enterprises amounted to 8%, in 2009 – to 18%.

Within the structure of the land fund of the territory, the agricultural lands occupy 87.5% of the total area (5,786,934 ha). The share of tillable lands amounts to 3,997,723 ha (60%), hayfields – 104,997 (1.6%), pastures – 1,626,359 (24.6), fallow lands – 14,074 (0.2%), and perennial plantings – 43,784 (0.7%). The total irrigated area amounts to 276.4 thousand ha. The irrigated tillable land accounts for 94% (or 259.1 thousand ha).

In all categories of farms, the structure of crop acreage features the expansion of the areas under the grains with maize from 1829.3 thousand ha (the year 2003) up to 2284.5 thousand ha (the year 2013), mainly due to the areas of such forage crops as annual

and perennial grasses (from 484.1 to 180.1 thousand ha). The pre-reform production structure of the most types of agricultural products has been lost with the exception of grain, sugar beet, and sunflower. The repeatability of the winter wheat placement by the headed preceding crops and the steady growth of the areas under sugar beet are marked (Nikonov, 1971). At the same time, the phytosanitary environment is deteriorating, and the soil fertility is reduced.

4. DISCUSSION

An analysis of the production and yield capacity of grains and leguminous as well as of sunflower, sugar beet, potatoes, vegetables, fruits, and grapes indicate on the modern instability of the crop growing sector (Table 1). The heterogeneity of natural conditions and the annual climatic variations require a more thoughtful approach to the farming techniques for cultivating the agricultural crops (Nikonov 1971).

In 2009, the federal budget support of the territory's agribusiness provided and fully funded 2823.4 million RUB, in 2010 – 2400.6 million RUB (without subsidies on mineral fertilizers). In 2009, the regional budget funded 1360.4 million RUB, in 2010 – 1159.1 million RUB. In 2012, the production of the gross agricultural output in current prices amounted to 68.7 million RUB (16% of the gross regional output).

An analysis of the usage of land fund of enterprises and organizations showed that the year 2009 was a turning point in the structure of crop acreages and natural forage grasslands of the large and small commodity producers (Table 2).

In the modern livestock production, the following crisis situation was formed: The number of all animal species sharply reduced, the structure of livestock population changed in all categories of farms, the problems with forages and their structural and nutritional imbalance appeared.

In the total number of livestock population, the share of private subsidiary farming (PSF) and PFE increased dramatically. If in 1996-2000, the number of livestock population in large agrarian land tenures amounted to 460.3 thousand conventional heads, then by 2006, the reduction in livestock population reached a level of 166.5 thousand conditional heads, and if to take into account the

PSF and PFE – 462 thousand conventional heads. During the period under review (1990-2013), the population of the small and bovine cattle decreased by 9.5 and 8.6 times, respectively.

The trend of loss-making enterprises is not reduced. The losses were received from the production of meat from bovine cattle (421.0 million RUB), wool (167.6 million RUB), and mutton (41.3 million RUB). With a decrease in the number of animals and areas of forage crops, the area under grains increased by 6 times. This led to the formation of non-rational structure of crop acreages with the destroyed system of crop rotations (Ryabov 1996).

In the livestock of the population farming, PFE and individual entrepreneurs produce up to 80% of milk, and more than 50% of eggs. The largest share of the production of forages is concentrated in agricultural enterprises, while the leadership in the production of the main types of animal products (meat, milk) is accounted for by PSF.

In the territory's livestock fodder balance, more than 70% accounts or bulky feed (hay, haylage, silage, and green feed) that is the basis of the diet of animals. However, the bulky feed conservation in the agricultural enterprises decreased. The area of forage crops growing also declined from 732.5 thousand ha in 1996-2000 to 299.2 thousand ha in 2005. All this led to the fact that the amount of conserved forage in agricultural organizations decreased from 2277 thousand tons of feed units to 656.3 thousand tons of feed units in 1996-2000, to 293.5 thousand tons of feed units in 2005, and to 261.7 thousand tons of feed units in 2006 (without grain fodder). Thus, the amount of forage conservation dropped to its lowest level in the last 15 years. Against the background of low productivity of 1 ha of forage, the produced fodders feature a significant shortage of protein and metabolizable energy. The accumulated problems in the livestock breeding lead to the increased mortality of small and bovine cattle (Shkalikov, 2002).

Thus, the main reasons for reducing the production of fodders and the deterioration of their quality is a general decline in the technical support of the industry, the destruction of previously established system of grass seed growing, the cessation of work on the improvement of natural forage lands, the simplified technologies for the fodder crops cultivation, the growth of the degradation of forage lands, etc. However, the rational use of the land and the means of production and labor are directly related

Table 1: Crop production (all categories of farms)

Agricultural crops	2008		2009		2010		2011		2012		2013	
	Production, thousand tons	Crop yield, hwt/ha	Production, thousand tons	Crop yield, hwt/ha	Production, thousand tons	Crop yield, hwt/ha	Production, thousand tons	Crop yield, hwt/ha	Production, thousand tons	Crop yield, hwt/ha	Production, thousand tons	Crop yield, hwt/ha
Grains and legumes	7157.2	33.0	8608.2	38.2	7091.9	31.3	7033.0	32.9	8369.1	39.0	4957.5	23.2
Sunflower	285.5	12.2	410.8	16.5	303.6	11.6	341.4	13.9	447.2	16.5	455.6	15.6
Sugar beet	964.3	345.5	1261.4	556.5	1149.1	505.6	1421.4	443.3	1925.7	165.6	1497.4	523.3
Potato	218.8	81.0	258.8	100.0	250.7	91.4	286.8	105.3	345.9	120.3	408.1	124.6
Vegetables	156.0	80.0	187.3	103.6	201.0	113.9	248.0	125.3	334.2	139.7	488.7	165.9
Fruits	42.4	37.2	41.1	39.4	36.9	48.9	40.5	38.6	37.6	34.1	54.9	37.6
Grapes	36.6	50.5	27.0	39.3	30.0	54.8	32.9	47.5	34.1	48.6	46.4	31.2

Table 2: The dynamics of using the land fund by the agricultural commodity producers of the Stavropol Territory, thousand ha

Commodity producer	2000	2008	2009	2010	2011	2012	2013
Enterprises and organizations							
Lands in total	5140.8	4926.2	4468.5	4424.9	4410.6	4406.0	4393.0
Agricultural lands including	4741.5	4517.9	4069.3	4027.7	4013.4	4088.7	3997.2
Tillable lands	3386.3	3207.9	2872.6	2844.1	2838.8	2835.7	2830.1
Fallow lands	10.2	9.2	9.4	9.5	9.3	9.2	9.2
Perennial plantings	20.5	18.3	15.3	15.6	14.9	14.3	14.3
Hayfields	83.7	84.2	77.7	79.2	79.1	78.9	78.9
Pasture fields	1260.8	1198.3	1094.3	1079.3	1071.3	1070.6	1064.5
Peasant (farming) agriculture							
Lands in total	550.8	694.6	792.1	859.8	888.7	893.9	9,090.7
Agricultural lands including	543.2	684.2	780.8	848.0	875.0	879.9	895.6
Tillable lands	476.5	574.3	645.8	673.4	682.1	686.9	697.3
Fallow lands	0.3	0.7	0.5	0.5	0.5	0.5	0.5
Perennial plantings	0.2	0.2	0.4	0.4	0.3	0.5	0.5
Hayfields	5.0	6.1	6.7	6.4	6.4	6.6	6.5
Pasture fields	61.2	102.9	127.4	167.3	185.8	185.4	190.3

to a science-based combination of the forage production industry sector with the sectors of crop growing and livestock breeding. It is this factor as well as a sharp reduction in forage production and the extensive nature of production that necessitate the development of a comprehensive program for the development of fodder production in the future (Pismennaya et al., 2013).

In view of the growing degradation of natural forage lands, it is proposed to change the system of grassland farming in the territory: To remodel the optimum agrophytocoenoses. The increased production of green fodder occurs through the establishment of perennial cultural pastures, which will satisfy up to 50% of demand for green fodder. The increased share of pasture forage in the general structure of feed production will reduce the cost of summer diet by 2.5-3.0 times, and increase the profitability of livestock production. It is planned to obtain the main effect from the intensification of grassland management through the application of the system of pasture rotations, the cultivation of differently coloring species and cultivars of perennial legumes and grain grasses in the simple and complex grass mixtures, the rational use of grass stands, by optimizing the terms of harvest time due to the better provision with technical means.

4.1. The Territorial Potential of the Territory

The specialization of the territory's agriculture was formed directly under the influence of a complex of factors and has territorial peculiarities. In the Stavropol Territory, there are determined four zones of agricultural specialization, which are diverse in their economic conditions (the predominant types of agricultural farms, specialization, a set of cultivated crops, and industries) and their natural conditions (uniqueness of relief, humus content of soils, and the bonitet score of the tillable land soils), which vary from the southwest to the northeast (Table 3). The current agricultural specialization leads to the loss of the valuable farmlands and to the reduction in potential and effective soil fertility.

The structure of the agricultural lands of the first zone includes: Tillable lands – 842,444 ha, pastures – 738,893 ha, hayfields – 25,382 ha, fallow lands – 1881 ha, and perennial plantations – 4983 ha (Table 4).

The first zone is the sheep breeding one (extremely arid), which is characterized by a relatively high proportion of natural hayfields and pastures in the structure of agricultural lands – 47.4%. The yield capacity of pastures and hayfields amounts to 7.0 and 13.1 hwt/ha, respectively. The population of sheep and goats amounts to 1468.9 thousand heads, bovine cattle – 106.1, and cows – 55.4.

The availability of large areas of the natural forage grassland of the arid-steppe and desert-steppe types contributes to the development of sheep breeding in the zone, which accounts for 88.9% of the population. The development of the livestock industry involves a variety of forage crops.

The total crop acreage amounts to 495.0 thousand ha (including under grains and legumes – 405 thousand ha, the gross yield of grains and legumes – 593.6 thousand tons). The area of field-protective forest stands amounts to 15,173 ha. In connection with the introduction of the dry farming system, the areas of complete fallows increased in the extremely arid zone. Currently, they amount here to 340,465 ha or 38.5% of the total area of complete fallows within the territory. This important link in the system of agriculture contributed to both the growth of grain production and to the improvement of its quality (MacArthur and Wilson, 1967).

The availability of the irrigated lands allows us to grow many forage crops and build the systems of forage production based on an irrigated field. At the same time, there are created the conditions for the implementation of the grain-fallow farming system on bogharic lands using mainly the best predecessors for the winter wheat. The predominant types of farms in this zone are the sheep breeding and the grain growing and sheep breeding.

The score of bonitet of the agricultural lands is 30, the cadastral value of agricultural lands is 3200-20,000 RUB/ha (Selivanova et al., 2015). An indispensable condition for the full implementation of the grain-fallow farming system in the sharply arid steppe regions is to separate the sheep breeding from the grain industry in order to avoid grazing in the stubble. Therefore, the creation of a sustainable feed supply relies on the intensification of the irrigated agriculture and natural feed grasslands.

Table 3: Agro specialization in agriculture by the structure of commodity products, %

Sectors	Zones							
	I – sheep breeding		II – grain growing and sheep breeding		III – grain growing and cattle breeding		IV – near resort area	
	1990	2012	1990	2012	1990	2012	1990	2012
Crop production	57.9	87.2	56.9	91.9	56.0	65.6	42.3	80.3
Livestock production	42.1	12.8	43.1	8.1	44.0	34.4	57.7	19.7

Table 4: The characteristic of agricultural zones of the Stavropol Territory

Indicators	Zones			
	I – sheep breeding	II – grain growing and sheep breeding	III – grain growing and cattle breeding	IV – near resort area
The area of agricultural lands, ha, including	1,613,583	2,132,045	1,443,198	574,088
Tillable lands	842,444	1,644,626	1,044,469	453,674
Hayfields	25,382	19,466	36,678	23,172
Pasture fields	738,893	450,501	347,637	87,564
Fallow lands	1881	6523	5574	-
Perennial plantings	4983	10,929	8840	9678
The area of field-protective forest stands, ha	15,173	40,130	29,656	12,588
Total livestock population, thousand heads, including	1653.1	686.1	655.7	124.5
Sheep and goats	1468.9	411.6	348.8	49.3
Bovine cattle	106.1	119.5	112.0	35.0
Cows	55.4	60.8	51.2	18.4
Pigs	23.6	94.2	144.5	21.8
The predominant production types of enterprises	Sheep breeding; grain growing and sheep breeding	Grain growing and sheep breeding; grain growing and cattle breeding	Grain growing and cattle breeding	Fruit growing; grain growing and cattle breeding; vegetable growing
The cadastral value of agricultural lands, RUB /Ha	3200-20,000	26,900-59,000	35,500-99,500	32,518-66,900
An average score of bonitet of agricultural lands	30	46	58	60

The structure of the second zone agricultural lands – Grain growing and sheep breeding (arid) – includes: Tillable lands – 1,644,626 ha, pastures – 450,501, hayfields – 19,466, fallow lands – 6523, and perennial plantings – 10,929. The vastness of the territory of the second zone, a relatively high percentage of ploughness (68.9%), and relatively fertile soils provide it with the leading position in the production of commodity grain, mainly of winter wheat.

The total crop acreage makes 1120.4 thousand ha (including under grains and legumes – 881.2 thousand ha, the gross yield of grains and legumes – 1876.5 thousand tons). The area of field-protective forest stands amounts to 40,130 ha.

The share of natural hayfields and pastures in the structure of agricultural lands is 22.1%. The yield capacity of pastures and hayfields amounts to 8.3 and 16.3 hwt/ha, respectively. The population of sheep and goats amounts to 411.6 thousand heads, bovine cattle – 119.5, and cows – 60.8.

The perspective branches in the second zone remain the grain production, breeding sheep production, cattle breeding (beef-milk and beef), horticulture and viticulture. The predominant production types of farming are the grain growing and sheep breeding and the grain growing and cattle breeding.

A set of natural factors in the prevailing types of farms stipulates the advantage of the grain-fallow-arable and grain-fallow systems of crop growing. In this regard, in the second zone, the areas of complete fallow are significantly expanded up to 426,065 ha,

which allows an increase in the cultivation of winter wheat up to 40% of crop acreages.

The score of bonitet of the agricultural lands is 46, the cadastral value of agricultural lands is 26,900-59,000 RUB/ha. In the grain growing and sheep breeding zone, the problem of preservation and rational use of water, and implementation of a complex of soil conservation measures are also put forward to the first place.

The structure of the third zone agricultural lands – Grain growing and cattle breeding (of unstable humidification) – includes: Tillable lands – 1,044,469 ha, pastures – 347,637, hayfields – 36,678, fallow lands – 5574, and perennial plantings – 8840. The third zone, which covers the central districts of the territory with the fertile black soils and good moisture regime as well as with a wide variety of composition and the ratio of agricultural lands, is suitable for the cultivation of many crops. The winter wheat remains the leading commodity crop. In this zone, the main crops of sunflower, sugar beet, castor beans, coriander, hemp, and in the future of soybeans are concentrated.

The availability of large irrigated areas, the proximity of the industrial processing enterprises, and large cities are responsible for the development of vegetable production with a wide range of cultures. Horticulture is widely developed (Sivokon, 2015).

The total crop acreage makes 882.3 thousand ha (including under grains and legumes – 581.3 thousand ha, the gross yield of grains and legumes – 1805.1 thousand tons). The average yield capacity

of winter wheat is 31 hwt/ha, the gross yield is 1621.0 thousand tons.

The share of natural hayfields and pastures in the structure of agricultural lands is 26.6%. The yield capacity of pastures and hayfields amounts to 11.6 and 17.7 hwt/ha, respectively. The population of sheep and goats amounts to 348.8 thousand heads, bovine cattle – 112.0, and cows – 51.2. The score of bonitet of the agricultural lands is 58, the cadastral value of agricultural lands is 35,500-99,500 RUB/ha.

The favorable conditions of this zone provide opportunities for growing the exceptionally wide variety of forage crops. In the future, the main branches may be the grain farming, dairy and beef cattle breeding. The industrial crops will be cultivated within the biologically acceptable limits.

The third zone is dominated by the grain growing and cattle breeding type of enterprises. There are poultry breeding, fattening, fruit growing, vegetable growing, and other highly specialized enterprises. In the future, the grain growing and cattle breeding type will remain the dominant one (Sedykh et al., 2013).

In the saline soils of the third zone the complete fallows are introduced. In 2012, their area has reached 79,001 ha. However, in the conditions of unstable moistening the complete fallows should be supplemented by the cropped fallows as well. The irrigation plays an important role in the intensification of the crop growing branches and in the possibility of their further development.

The structure of the fourth zone agricultural lands – near resort area (of sufficient humidification) – includes: Tillable lands – 453,674 ha, pastures – 87,564, hayfields – 23,172, fallow lands – absent, and perennial plantings – 9678. In the farms of the fourth near resort area, the most intensive branches of agricultural production are developed (Hulin et al., 2014).

The total crop acreage makes 375.1 thousand ha (including under grains and legumes – 260.7 thousand ha, the gross yield of grains and legumes – 687.6 thousand tons). The average yield capacity of winter wheat is 31 hwt/ha, the gross yield is 372.6 thousand tons.

The share of natural hayfields and pastures in the structure of agricultural lands is 19.3%. The yield capacity of pastures and hayfields amounts to 11.6 and 14.8 hwt/ha, respectively. The population of sheep and goats amounts to 49.3 thousand heads, bovine cattle – 35.0, and cows – 18.4. The sheep breeding does not play any significant role in the economy of this zone (Ivannikov et al., 2014; Esaulko et al., 2015).

The score of bonitet of the agricultural lands is 60, the cadastral value of agricultural lands is 32,518-66,900 RUB/ha.

The enterprises and organizations of this zone are intended to meet the needs of the cities and resorts of the Caucasian Mineral Waters for the slightly transportable and perishable products. The availability of the large canneries dictates the necessity to develop here the vegetable growing and fruit growing production, and the

proximity of the resorts – To develop the production of dairy cattle and poultry. And this, in turn, will require strengthening the forage base. Its development, the same as in other zones, will follow the way of intensification of the non-irrigated and irrigated agriculture, the introduction of high-yield, high-protein crops, such as alfalfa, canola, triticale, and legume-grass, and other forage mixtures.

In the fourth zone more than in other highly specialized intensive enterprises (vegetable growing, fruit growing, wine-growing, fattening, poultry breeding, and pig farming). There are also specialized grain and livestock farms. In perspective, the farming systems in the near resort areas should be built taking into account the development of intensive industries and a wide variety of production types of farms.

5. CONCLUSION

Thus, the agricultural and economic transformations have introduced significant corrections both in the structure of the gross and saleable output of the territory, and in the zonal specialization. The main factors determining the specialization in its contemporary form have become the economic and environmental ones. Therefore, the agricultural farming of the territory is unstable and poorly manageable, and depends on weather conditions. The mitigation of these adverse factors can be achieved through the use of rational farming systems. The existing structure of the location of production and major types of the agricultural products of the agricultural zones in the Stavropol Territory as a whole do not reflect the specific climatic conditions of the area and are not favorable for the development of large-scale and intensive agricultural production. The current production instability of the agricultural land management is costly to build industrial infrastructure for processing and storage of agricultural products or to purchase abroad the missing products in the lean years. In order not to repeat past mistakes and difficulties in the intensification of farming lands, it is necessary to solve organizational and territorial, environmental, technological, financial, logistical, and other problems within the natural resource potential of the natural landscape (Forster, 1961).

The Stavropol Territory is embarking on the implementation of the national idea of maintaining the sustainable land management, the strategic aim of which is to enhance the quality and level of life of the population, the dynamic development of the rural economy and the social sphere on the basis of the scientific and technological progress while preserving the reproductive capacity of natural systems. The main expression of the new paradigm becomes the formation of a new territorial model with an ecologized natural resource management.

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