Natural and resource capacity as a basis for sustainable development of rural areas in the Non-humus zone in the Republic of Bashkortostan

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Abstract. The role of the natural resource capacity as a key factor of sustainable development in rural areas is actualized in the article. We point out that the development of a strategy for the sustainable development of rural areas is impossible without comprehensive accounting and assessment of the natural and climatic conditions of the functioning in the considered area. An analysis of the current state and development of the natural resource capacity in rural areas is made on the example of the Non-humus zone in the Republic of Bashkortostan. A detailed description of the climatic conditions at the regional level is given. The actual agricultural specialization and combination of crop and livestock sectors of agro-organizations is established taking into account the differentiation of natural resource and soil-climatic conditions and is caused by regional differences. It is affirmed that the Non-humus zone in the Republic of Bashkortostan has a great natural and resource potential, which, with effective use, makes it possible to ensure sustainable development of rural areas. The main part of the territory under consideration has sufficient bioclimatic and soil resources, which allow creating sustainable premises for the development of agricultural industries, the production of basic types of food. We concluded that natural and soil-climatic factors have a significant impact on the conditions of functioning of modern agriculture, which, in turn, directly affects the sustainable development of agro-organizations. We summarized that the design of the main options of the sustainable development strategy for rural areas of the Non-humus zone in the Republic of Bashkortostan should directly take into account the specific features of the development of the natural and resource capacity of the area.

1. Introduction
At In the 21st century, the concept of sustainable development has become one of the fastest growing and priority areas of scientific research that have been recognized internationally. Some statements in the concept of sustainable development have become a kind of system-forming ideology in economically developed countries and a number of strategic documents adopted at international and national levels include methodological provisions for ensuring sustainable development of various territorial systems, including rural areas.

Today, the interest to the scientific community in the problems of sustainable development in rural areas, the ability of agro-organizations to survive and adapt to changes in the external environment, taking into account the high degree of uncertainty and the reduction of the regulatory role of the state, is growing in the Russian Federation. In the context of the difficult social and economic situation in this country and the imposition of sanctions by the United States and its allies, the transition of rural...
areas to the path of sustainable development is an important and relevant area of modern scientific research.

The direction and pace of sustainable development of rural areas are determined by the potential and, in particular, their natural and resource component. The natural resource potential is an important characteristic of rural development, reflecting the location of natural resources, the availability of agricultural sectors to them, their influence on the formation of economic specialization and the spatial organization in rural areas. The effective use of the natural resource potential is one of the main strategic priorities in rural development and may serve as a starting capital for the sustainable development of rural areas. Natural resources can be considered as internal reserves of rural development and they represent an objective basis for the implementation of the strategic goals of sustainable development of rural areas. Consequently, the set goals and available natural resources form an inseparable unity and represent an integral object of sustainable development of rural areas.

The availability of diverse natural resources is one of the main competitive advantages in rural areas. The quantitative and qualitative characteristics of natural resources on a territorial scale determine the actual specialization of the branches of agriculture, the potential opportunities for the agricultural sector growth. The level of labor productivity of workers employed in rural areas directly depends on the degree of availability of natural resources. The optimal combination of the main types of natural resources makes it possible to attract additional investment capital into strategic projects for the sustainable development of rural areas.

We should point out that the natural and climatic conditions directly determine the development of rural areas, the resource availability in the agricultural sector economy, the village population living. The natural factors are an important reserve of saving material, technical and labor costs, an effective increasing means for the volume of agricultural products production.

2. Results and Discussion

The Republic of Bashkortostan belongs to the regions in the Russian Federation with a developed network in rural territories, includes 54 municipal districts, 818 rural settlements and 4,532 rural settlements in its territorial structure. Rural areas are the most important part of the national economic complex in the republic and their sustainable development is a main task.

The region has a great natural and resource potential, which, with effective use, can ensure sustainable development of rural areas [1, 2]. The formation of strategic goals for sustainable development in rural areas requires an assessment of the possibility for achieving them through optimizing of all available resources. According to calculations carried out by Doctor of Economic Sciences, Professor of the Bashkir State Agrarian University A.A. Askarov, "with optimal use of available natural and climatic resources, the republic's agriculture is able to provide food substances in the form of protein and carbohydrates 6.4-6.5 million people, energy - 5.8 million people. This is 40-60% more than the population of the republic, which has a little more than 4 million people" [3, p. 140].

According to the natural and agricultural zoning, the Republic of Bashkortostan refers to the temperate zone. The actual agricultural specialization and combination of crop and livestock sectors in agro-formations of the region is established according to differentiation of natural resource and soil-climatic conditions and is caused by zonal differences.

The natural-resource and soil-climatic conditions in the Republic of Bashkortostan are very diverse, they are not always favorable for the agricultural production and are distinguished by pronounced horizontal and vertical zoning [4]. The common territorial zoning in the region was carried out in the middle 50s of the last century. The expediency of territorial zoning was caused by the need to use the entire natural and resource potential of the region most effectively. In accordance with soil characteristics, the territory of the Republic of Bashkortostan (similar to the territory of the Russian Federation) is subdivided into the Non-humus and Humus zones. The Non-humus zone of the republic in comparison with the Humus zone is characterized by more unfavorable natural and
climatic conditions and comparatively worse indicators of a qualitative assessment of arable land has higher indicators reflecting the supply of precipitation during the vegetation period. According to the system of agricultural management adopted in the Republic of Bashkortostan, three natural climatic (agricultural) subzones with predominance of soils of the non-humus type are included in the Non-humus zone:

- The Northern forest-steppe subzone (fourteen municipalities);
- The North-eastern forest-steppe subzone (five municipalities);
- The Mountain forest subzone (three municipalities) [5].

The dedicated subzones are territorially limited natural complexes, delimited by relief, climatic and hydrological conditions, and soil cover. The detailed characteristic of the climatic conditions in the Non-humus zone in the Republic of Bashkortostan is presented in Table 1.

Table 1. Characteristics of the climatic conditions of the Non-humus zone of the Republic of Bashkortostan [5-7].

| Indicators                                      | Non-humus zone                  |
|------------------------------------------------|---------------------------------|
|                                                | The Northern forest-steppe      |
|                                                | subzone                         |
|                                                | The Northeastern forest-steppe  |
|                                                | subzone                         |
|                                                | The Mountain-forest subzone     |
| Number of municipalities                       | 14                              |
| The sum of precipitation, mm:                 |                                 |
| - in a year                                    | 556                             |
| - for vegetation period                        | 350                             |
| Average annual temperature, °C                 | 2.1                             |
| Sum of positive temperatures, °C               | 2350                            |
| The sum of temperatures, °C:                   |                                 |
| - for a period above 5 °C                      | 2150                            |
| - for a period above 10 °C                     | 2000                            |
| Hydrothermal Coefficient                       | 1.2                             |
| Humidity factor                                | 0.73                            |
| Duration, days:                                |                                 |
| - frost-free period                            | 115                             |
| - with snow cover                              | 163                             |
| Average height of the snow cover, cm           | 55                              |
| Probability of drought, %                      | 10-20                           |
| Number of dry days                             | 31                              |
| Qualitative assessment, points:               |                                 |
| - arable land                                  | 81                              |
| - hayfields                                    | 30                              |
| - pasture                                      | 17                              |
| - agricultural land                            | 65                              |

The natural and climatic conditions of the Non-humus zone are suitable for cultivating individual crops. According to the availability of precipitation, especially during the growing season, the northern and mountainous regions in the Non-humus zone belong to the territory of sufficient moisture. The meteorological factors are generally favorable for obtaining stable harvests of crops of agro formations of the Non-humus zone.

However, in spite of the sufficient amount of precipitation in the Northern forest-steppe and in the Northeastern forest-steppe subarea, in some periods crops may suffer from a lack of moisture. At the same time, a negative sign that adversely affects the development of thermophilic crops, and in
particular spring crops, is the emergence of early autumn and late spring frosts in various regions of the Non-humus zone.

Essential factors contributing to the decline in soil fertility of the Non-humus zone are: non-observance of scientifically based agro technologies, in particular, crop rotations, increased erosion processes, and a reduction in nutrients and phosphorus in soils [8].

Thus, for the cultivation of winter rye, the territory of the Northern forest-steppe subzone, in contrast to the Northeastern forest-steppe subzone and the Mountain-forest subzone, has conditions that are more favorable. At the same time, the conditions for overwintering winter wheat for the subzones in question are not favorable [9]. The adaptive capacity of such crops as spring wheat, barley, oats, peas and buckwheat allows them to be cultivated in all three subzones. In the Northern forest-steppe subzone at the existing level of technology intensity (technological costs), the economic efficiency of wheat grain production will be low [10]. The research shows that the agro-organizations of the Northern forest-steppe subzone need to focus primarily on the development of livestock and fodder grain production in order to achieve complete self-sufficiency in the livestock sector with high-quality fodder [11].

At the same time, the grain industry should be the basis of agricultural production and its support and financing by the state will allow forming positive prerequisites for the development of meat and dairy cattle breeding and pig production. However, in the Northeastern forest-steppe subzone and in the Mountain-forest subzone, the vegetation of plants occurs largely at a low sum of positive temperatures, which limits the formation of high-quality grain [7, p.30).

For the subzones under consideration, the heterogeneity of the soil cover and the complex state of the soil types are characteristic, which, in turn, determines the different possibilities of rural commodity producers in the production of agro-food products. In the composition of agricultural subzones, according to the principle of uniformity of the soil cover and uniformity of natural climatic conditions, nine agro-soil regions are distinguished. As the authors of the study "Problems of sustainable development: peace, Russia, Bashkortostan" note, "the agriculture of Bashkortostan so far solves the problems of food security due to the natural high fertility of chernozem and dark gray forest soils. However, with the existing system of soil exploitation, the potential for their fertility can be exhausted, which will lead to tragic consequences" [12, p. 153].

An important component of the natural resource potential of rural areas is land resources. It should be noted that for 2000-2016, the area of agricultural land in general in the Non-humus zone has changed insignificantly and in 2016, it was 2.1 million hectares. A qualitative assessment of arable land of the Non-humus zone is on average 83 points, hayfields - 31, pastures - 19. In the Northern forest-steppe and Northeastern forest-steppe subzones, the plowing of agricultural land is higher (more than 70%) than in the Mountain-forest subzone (35-40%). However, the mountain-forest subzone, unlike the other subzones under consideration, is better provided with hayfields (35%) and pastures (25%).

The total sown area of agricultural crops used by agro formations of the Non-humus zone over the same period declined by 347.9 thousand hectares or 31.9% and in 2016 amounted to 742.7 thousand hectares (Table 2).

| Land Plots                     | 2000  | 2005  | 2010  | 2015  | 2016  |
|-------------------------------|-------|-------|-------|-------|-------|
| Agricultural grounds          | 2173.7| 2157.1| 2160.8| 2159.4| 2159.2|
| Arable land                   | 1323.4| 1014.6| 1016.7| 1011.4| 1011.5|
| Crop area agricultural crops, total | 1090.6| 789.0 | 821.7 | 746.2 | 742.7 |
| - incl. cereals               | 558.7 | 367.9 | 448.1 | 386.1 | 385.1 |
The distribution of crops according to the zonal characteristic, basically, corresponds to their soil-climatic conditions. It should be noted that at the zonal level over the period from 2000 to 2016 there is a significant decrease in the acreage of grain and forage crops, sunflower, potatoes, vegetables, mainly due to the reduction of their crops in agricultural organizations.

The existing zonal specialization of agriculture, in general, corresponds to the peculiarities of the natural and climatic conditions. At the same time, considering the reasons for the inefficient production of agricultural products we would like to use the study "Institutional bases for the modernization of the agro-industrial complex of the region (on the example of the Republic of Bashkortostan)". They note that "the production of food products in our country, including the Republic of Bashkortostan, relatively more stringent natural conditions, primarily because of territorial peculiarities in heat and moisture supply, as well as their distribution over periods of plants vegetation. As a result, the bioclimatic potential of our lands is significantly lower (approximately 2.3-3 times) than in the USA and France, the FRG, England" [3, p. 60].

3. Conclusions

Therefore, natural and agricultural zoning is an effective tool, allowing to take into account the actual location of agricultural sectors and to identify potential opportunities for sustainable development of rural areas. In general, the main part of the territory of the Non-Humus zone of the Republic of Bashkortostan has sufficient bioclimatic and soil resources that help to create sustainable prerequisites for the development of crop and livestock sectors, self-sufficiency of the population through own production of sufficient volumes of agro-food products. With competent and rational use of the natural resource potential of the Non-Humus zone, rural commodity producers have all the prerequisites for effective development of agricultural production.

We may conclude that the natural resource potential of the Non-Humus zone of the Republic of Bashkortostan forms the strategic basis for sustainable development of rural areas. The specificity and specificity of natural and soil-climatic factors at the level of the allocated subzones exerts a significant influence on the conditions of the functioning of agro-formations, which, in turn, directly affects the sustainable development of rural areas. It is necessary to emphasize that the allocated subzones provide accurate "targeting" of strategic planning for sustainable development of rural areas.

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