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NATURAL AGRICULTURAL ZONING AND AGRO-PRODUCTION GROUPING OF SOILS OF ARARAT SOIL DISTRICT OF REPUBLIC OF ARMENIA IN WRB SYSTEM

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Abstract. The correct natural agricultural zoning of the territory is one of the foundations promoting the improvement of the use of land resources, and therefore the general subsidence of agriculture. The scientifically grounded natural agricultural zoning can serve as a basis for the proper allocation of the branches of the farming, for the implementation of specialization, for the development and introduction of rational crop rotations and appropriate agricultural crops, for the application of advanced agricultural-technical, anti-corrosive and agro-meliorative techniques. The article deals with the issues of natural agricultural zoning of the territory of the Ararat soil district of the Republic of Armenia. The characteristics of soil fertility with the goal of the most rational study of lands in the agricultural production is given based on the existing materials on the study of the soil cover, the results of new studies and details of the natural agricultural zoning of the land fund of the given district. On the basis of comprehensive analysis and summary of existing materials on climate, relief, exposure, soil-forming rocks, soils and other economic and production factors, a scheme of natural-soil zoning and agro-production grouping of soils of the Ararat soil district of the RA has been developed, and the characteristics of fertility of the identified natural-soil regions and groups of soil, as well as the main ways on the increase of the productivity and fertility of lands has been presented. It is established that they can be used during the planning of agricultural and zootechnical, meliorative, agro-meliorative and soil protection arrangements envisaged for the improvement of the use and increase of productivity of the land fund of the republic.

Key words: natural-soil district, agronomic group of soils, hypsometric marks, irrigation erosion, compaction, secondary salinization of soils, irrigation.

INTRODUCTION

The Republic of Armenia is a landless, typically mountainous country. The average height of the territory is 1800 m above the sea level. The Republic is within geographic latitudes with significant values of aridity and continentality of the climate. A complex geological structure, dissected relief, a variety of soil-forming rocks, climate and vegetation, and finally, human economic activity determined the pestriota and typological diversity of the soil cover. Almost all zonal soil types in the territory of Europe are found within the republic. Now there are few lands such as virgin lands due to the cultivation of which can provide the population with food products, and the industry with raw materials. The only way to solve this problem is to increase the fertility of the land.The purposeful use of the soil resources of the Republic of Armenia is possible only in case of comprehensive agronomic characteristics and assessment of fertility, the proper registration and determination of soil areas, which is carried out only on the background of soil-agronomic zoning and agro-production grouping of soils.

Natural and agricultural zoning should satisfy the need of the central and local agricultural organizations when solving the issues on the use of land resources in the interests of agriculture. Natural and agricultural zoning can serve as a basis for the proper placement of crops, taking into account their needs for soil and natural

conditions of the territory, as well as for the elaboration of arrangements on the improvement of the protection and increase of soils productivity. A new classification and nomenclature of soils of the Republic of Armenia has been presented in accordance with the soil resources criteria of the World Reference Base for Soil Resources (WRB) [1-3].

OBJECTS AND METHODS

The soil cover of the Republic of Armenia, which is sharply heterogeneous by the character of distribution in the vertical zoning system, became the subject of the research. Almost all the zone types, subtypes, varieties and other low taxa of soils which are formed in the territory of Europe are found in the soil cover of the republic.

However, as a result of the formation of soils in the mountainous conditions of Armenia, depending on the natural and climatic conditions, the diversity of soil-forming rocks and other factors of soil formation, soils on their genetic-production characteristics greatly differ from each other, even within the same type or subtype. Therefore, from the point of view of their use in agricultural production, they require quite different arrangements on the preservation and increase of productivity and fertility.

With the purpose of more correct registration, assessment and practical use of climatic resources and peculiarities of soils, the natural-soil zoning and agronomic soil grouping is carried out within the recently improved scheme of natural and agricultural zoning of the land fund of the republic. In the natural zoning of the republic, the unification of territories within each taxonomic unit is carried out proceeding from the unequivocalness of the natural conditions of the territory and the character of the use of the land fund in agricultural production connected with it.

RESULTS AND DISCUSSION

Edilian R.A., Melkonyan K.G., Hovsepyan I.M., Edilyan R.A., Mkrtchyan R.S. [4-6], Ghazaryan U.K., Melkonyan K.G., Mkrtchyan G.A. were mainly engaged in the natural and agricultural zoning of the Republic of Armenia [7].

The proposed scheme of natural and agricultural zoning has been developed on the basis of a comprehensive study and consideration of all natural and economic factors affecting the formation of soil cover and the use of land resources. Both the large-scale soil-cartographic materials and the latest data on geology, geomorphology, hydrogeology, climatology, geobotany, etc. have been used for the elaboration of a scheme for natural and agricultural zoning. At the same time, the prospects for the development of agricultural production in various natural and agricultural areas of the republic have been taken into account.

The natural and agricultural zoning of the Republic of Armenia has been guided by the methodological recommendations on the compilation of agronomic characteristics of soils developed by the Soil Institute after V.V. Dokuchaev and includes the following soil-territorial units: natural-soil district, natural-soil region and agronomic groups of soils [8, 9].

The features characterizing the geomorphological, hydrogeological, orographic and morphostructural structure of the territory, the composition of the soil-forming rocks, the meliorative state and the general characteristic features of the use of soil cover in agricultural production, as well as the agro-climatic indices determining the formation of close soil types in the genetic-production relation, were taken into account while outlining the natural-soil district [10].

The degree of complexity and homogeneity of the oromorphological and agro-climatic conditions of the territory, characterized by a definite complex of natural and ecological conditions, leading to the development of close subtypes in the genetically-industrial relation, rarely the types of soils, were taken into account while outlining the natural-soil areas. At

the same time concrete ways of the use of soil resources have been taken into account in the agricultural production.

Soil taxonomic units have been united in agro-production groups, proceeding from the generality of their ecological conditions for agricultural crops and the uniformity of the agrotechnical and meliorative arrangements carried out on these soils.

When outlining the agronomic groups of soils, both the diagnostic features of soils and the steepness and exposition of slopes, the dismemberment and drainage of the territory, the genesis and the nature of the parent rocks were taken into account as the main criteria and their parameters [11-13].

Since the administrative division of the territory of the republic is mainly carried out along the natural borders, so the boundaries of the natural and agricultural areas basically coincide with the administrative ones. Such zoning makes it possible for the specific administrative-territorial units to determine the optimum proportions of lands, the reserves of the expansion of agricultural lands, assess the fertility of soils in specific conditions of the given territory, differentiate the complex of agrotechnical and meliorative arrangements and determine the areas of their effectiveness.

Based on the analysis and summary of the authentic material on a number of genetic types, subtypes and varieties of soils, as well as the climatic conditions of separate regions of the republic, a scientifically grounded division of the soil cover into natural-soil districts and regions was carried out with the purpose of comprehensive characteristics of the elements of soil fertility of concrete administrative and economic regions, and within the natural-soil areas - to the agro-production groups.

Thus, five natural-soil districts, 16 natural-soil areas and 74 agricultural production groups, whose characteristics are given below, are distinguished on the basis of the aforementioned principles of zoning within the republic [6].

A brief description of the Ararat natural-soil region is presented below.

The Ararat region covers the territory of the Ararat basin with the total area of 836.9 thousand hectares or 28 % of the total area of the republic. Volcanic relief forms prevail in the region, among which the sloping plains, plateaus and gentle slopes (< 7^0) occupy about 70 % of the territory. The soil cover is dominated by Calcisols, Antrosols, Kastanozems and Chernozems.

The climate of the region is dry continental with a moderately cold winter and hot, and within the steppe zone moderately warm summer. Depending on the height of the area and the relief, the snowiness of the winter varies widely from very little snow to many snows in the mountains.

Forests are almost absent within the boundaries of the region, they are preserved on the medium-altitude slopes of the mountains and gorges of rivers only in the form of separate islands.

The area of agricultural lands does not exceed 42 %.

In the region the agriculture is specialized on the lower plains and foothills (up to an altitude of 1500 m) for cultivating perennial and annual technical and vegetable-melons, and in the medium-mountainous territories for cultivating cereals and perennial grasses.

High-mountainous territories of the region, where Umbrisols (Leptosols) and Phaeozems, are developed, are used as natural fodder lands.

The elaboration and implementation of arrangements aimed at preventing soil erosion processes is one of the most important tasks of the agricultural region, along with the increase of productivity of agricultural soils through the development of land irrigation and reclamation.

Four natural-soil areas are distinguished within the given region. Their brief description is given below.

1. The Araks district occupies the entire territory of the Ararat slightly inclined, poorly drained plain located between the Araks river, the Armavir, Low Hrazdan and Artashat canals within the limits of hypsometric marks of 800-1000 m above the sea level. The relief is slightly wave-plain, considerably dissected by the drainage irrigation and river network. The total area is about 170.0 thousand hectares or 20 % of the total area of the district, of which 65 % is used in agriculture.

The climate is dry, sharply continental with a very hot summer and cold, often snowless winter. The amount of positive temperatures> 10° makes 3900-4300°, and the period with the specified temperature is not less than 200-220 days. Here the average July air temperature is 23-26° C, the maximum temperature reaches 41.5° C, the absolute minimum in separate years descends to -30-33° C. In the given territory, the coefficient of atmospheric humidification makes 0.05-0.15, and the amount of precipitation for the year makes 200-300, of which 50-150 mm falls on the warm period of the year.

Antrosols prevail in the soil cover (about 54 %), which in the daisy foothill part of the territory yield to Calcisols, and in the lower undrained massifs to Solonetz-Solonchaks. More than half of Antrosols are profile alkali-saline soils and waterlogged, sometimes they are fused.

Under the conditions of intensive irrigation, they cultivate the vine, fruit, technical and vegetable-melon crops.

In order to increase the productivity of soils, along with the introduction of promising agro-meliorative and cultural arrangements, including rational methods for treating soils, it is necessary to strictly regulate the level of occurrence of groundwater in the territory for the prevention of salinization, to perform periodically deep loosening of soils for the elimination of the fusion of the transition horizon, as well as to widely practice the use of fertilizers and grass seeding for enrichment with organic substance and improvement of the nutrient regime of soils. It is recommended to widely use the rational irrigation regimes and the irrigation techniques preventing the phenomenon of irrigation erosion, compaction and secondary salinization of soils. It is also recommended to widely use chemical reclamation and drainage on massifs occupied profile alkali-saline soils and waterlogged differences.

6 agro-production groups have been outlined in the region.

The group of Residual leached, mostly deep-profile soils of subhorizontal plains, is characterized by considerable power, loamy-clayey mechanical composition, less often unity, high micro-aggregation and slight micro-aggregation, compactness of the sub-arable transition horizon, satisfactory water-physical properties. They are mostly cut off from groundwater, poorly rugged, slightly (< 2 %), but deeply (up to 60-90 cm) humusized, poorly provided with nitrogen available for plants, weak and medium phosphorus, but well supplied with exchange potassium.

In order to raise the productivity of the soils of this group it is necessary to periodically (once 4-5 years) destroy the compacted sub-arable horizon through deep loosening, to introduce organic fertilizers (at a rate of 20 tons/ha), and to apply the optimal irrigation rates of agricultural crops.

The group of Residual leached deep-latent soils of subhorizontal plains is characterized by average power, loamy mechanical composition, good micro-aggregation, leaching from carbonates, unsatisfactory content of available nitrogen, phosphorus and organic substances.

In order to increase their productivity it is necessary to use the optimal doses of mineral and organic fertilizers, taking into account the preservation and improvement of fertility indices, strictly regulate irrigation rates, and in the presence of

compacted sub-arable horizons to loosen with deep loosening once per 5 year. In some places, it is also necessary to regulate the depth of the groundwater.

The Antrosols group of deep alkali-saline subhorizontal plains is characterized mainly by average power, loamy-clayey mechanical composition, shallow bedding (1.5-2.5 m) of slightly mineralized groundwater, residual alkaline and alkaline-saline nature, considerable hydromorphism, as a result of which their natural productivity is greatly reduced.

In order to increase the productivity of the indicated group of soils, it is first necessary to lower the level of groundwater and to identify the most rational methods of irrigation.

The group of Calcisols of pebble irrigated soils of weakly inclined plains is characterized by a small, rarely average power, loamy-clay mechanical composition, a gravel-pebble structure of the profile, weak humus content. Most of these soils are washed up and outlined with unfavorable water-physical properties. In order to raise their productivity, it is necessary to use large doses of organic fertilizers, sideration, collection of profile stones and to adjust the irrigation rates [14].

The group Calcisols of irrigated soils of inclined plains and weakly dissected plumes is characterized mainly by the low power, amiesite nature, loamy mechanical composition, unstable structure, erosion hazard, adverse water-physical properties. For the increase of their productivity, it is necessary to use higher doses of organic fertilizers, cultivate perennial grasses, clearly regulate watering rates, collect stones, and enrich the active layer with clay fractions.

The group of Solonetz-Solonchaks is developed on the territory with a close occurrence of ground mineralized waters (0.5-1.5 m). They are characterized by a strongly alkaline reaction, a high content of exchangeable sodium, loamy-clayey mechanical composition, increased mineral content, water-physical properties unfavorable for plants growth. For the improvement of their agronomic properties it is necessary to carry out chemical reclamation according to the guidelines elaborated by the Scientific Research Institute of Soil Science and Agrochemistry of the Ministry of Agriculture of the ASSR (1982).

2. The Arzni-Shamiran district occupies the territory of mountainous and foothill trails of weakly dissected hummocky undulating plateaus, flat and sloping slopes of mountains located between the altitudes of 1000-1600 m above the sea level.

The area occupies 290,4 thousand hectares, or 35 % of the area, it is characterized by the dry continental climate with hot summer and winter with little snow. The annual precipitation is small - 200-470 mm, of which 60-65 % falls during the warm season. The coefficient of atmospheric humidification is 0.17-0.23.

The soil cover of the region is mainly represented by amiesite-rocky low-power, less often by medium-power carbonaceous and eroded Calcisols, Kastanozems and partly Acrisols, Cambisols of various degrees. Solonetz-Solonchaks also occupy the small areas. The cultivation of crops is mainly carried out under the irrigation conditions [15, 16].

Soils are used for growing of grapes, fruits, vegetables, melons and crops and perennial grasses.

Significant erosion, poor structure, tightness of the profile, increased porosity, poor availability of organic substance and easily moving soil nutrients require the use of basic meliorative, cultural-technical and soil protective measures.

6 agro-production groups of soils have been identified in the region.

The group of Light chestnut of the washed deluvial-silted low-carbonated soils of weakly inclined plains is characterized by the medium and high power, loamy mechanical composition, weak humus con-

tent, weak water resistance of aggregates and weak orbitalisation. They are distinguished by satisfactory water-physical properties, poorly provided with available nitrogen and phosphorus, medium and good potassium, little provided with organic substances and often profile-stone.

First of all, it is advisable to use these soils for fruits, grapes and vegetables and melons. However, before planting of perennial plantations, it is necessary to enrich the soil with organic nutrients with the restoration of its macrostructure and the release of the profile from the stones. On gentle slopes and inclined plains it is necessary to use anti-erosion measures to prevent irrigation erosion. Such measures are: the continuous sowing of perennial grasses in rows of fruit plantations, terracing, conducting of drainage ditches and regulation of the irrigation norms [17].

The group of Calcisols of weakly differentiated pebble, newly-irrigated soils of inclined plains and gentle slopes is mostly low-power, distinguished by sandy loamy mechanical composition, weak micro and macroaggregation, low humus content, weak availability of available forms of nutrients. Their profile is mostly slightly differentiated. The soils are stony-rocky, have high water permeability and a lower moisture capacity, as a result of which they are quickly subjected to flushing and erosion.

It is advisable to use the soils of this group primarily for the perennial grasses, and in 3-4 years they should be taken under multi-annual plantings.

For the increase of their productivity, it is necessary to conduct terracing, introduce organic fertilizers and materials rich in clay fractions, to regulate irrigation regimes with clarification of the calculated irrigation norms [4].

The group of Calcisols and Light chestnut of deep-stony-cemented soils of inclined plains and gentle slopes have been developed in the last decade. They are characterized by loamy mechanical composition, deep stony and cementation, good microaggregation, but weak water resistance of macroaggregates, low humus content and poor supply of readily mobile nutrients.

Soils are mainly transformed, they are used for the perennial plantings and are irrigated. In this regard, they are very erosion-hazardous [18].

In order to increase the productivity of soils, it is necessary to more widely practice grass-growing, apply higher doses of organic and mineral fertilizers, and strictly regulate the irrigation rates. On erosion-prone areas it is necessary to introduce soil-protective agrotechnical methods: horizontal plowing, creation of drainage ditches, narrow buffer strips of stones or perennial grasses. The latter is especially necessary when dealing with sloping soils under annual crops.

The group of Calcisols and Light chestnut in places not fully developed, frequently cemented and plastered soils of inclined plains is mostly low-power, gravelly loamy, slightly eroded. They are characterized by weak water resistance of aggregates, weak humus content, high porosity, as a result of which, when they are accumulated in different layers, illuvial-cemented horizons are formed, which cause low power of these soils. The nature of the enumerated properties is the main reason for the formation of waterproof layers in the profile of the indicated soils.

Soils of this group are characterized by low water capacity, low water permeability, and therefore erosion-hazardous. Since these soils are in favorable climatic conditions and after cultivation they are allotted for the perennial plantations, in order to increase the root layer it is necessary first to loosen the cemented horizons, clean the stones, enrich the soil with organic and nutrients, introduce anti-erosion measures and conduct watering according to the norms provided for such soils.

The group of Solonetz-Solonchaks of interbooted sloping plains and gentle slopes, low-power, sometimes landslide-

dangerous is characterized by clayey mechanical composition, low content of organic substances, alkaline profile. They are poorly aggregated, fractured, have a high dead moisture reserve, low water permeability, and when watering they swim and strongly swell, resulting in erosion processes. They are very poorly provided with available forms of nitrogen and phosphorus, medium and good potassium.

To improve and protect the soils of this group, it is necessary to widely apply terracing on sloping areas, introduce dry acid ameliorates into the soil, and develop irrigation. After reclamation of soil it is necessary to enrich it with organic fertilizers and light soils and in the first years to use for annual grasses on the background of applying soil protection techniques [19].

The group of Calcisols and Light chestnut, in some places of poorly differentiated and incompletely re-irrigated soils of gentle and moderately sloping slopes, is characterized by low power, gravel, sandy loamy mechanical composition, poor water resistance of aggregates, low water capacity, high permeability, low plasticity and connectivity, medium and strong erosion, weak humus content, poor in nitrogen and phosphorus, medium and well-supplied with potassium.

It is more advisable to use the soils of this group for perennial plantations with the content of rows under grasses.

To raise their productivity, it is necessary to apply large doses of organic and mineral fertilizers to the soil, to clearly regulate the norms for watering crops and to introduce the anti-erosion measures.

3. Khosrov-Vayots Dzor region

The Khosrov-Vayots Dzor region occupies the middle-sized territories of the basins of the Azat, Vedi, Arpa rivers, within the boundaries of the Artashat, Ararat, Yeghegnadzor and Vayk regions, between the hypsometric elevations of 1600-2500 m above the sea level. The relief is dominated by gently sloping, often heavily dissected slopes; strongly inclined volcanic plateaus begin dominating only within the limits of 2200-2300 m. From the surface, the territory of the area is mosaically covered with rock outcrops and their debris. The area of the region is 264.5 thousand hectares or 32 % of the district's area.

The area is characterized by the warm climate with a long summer and a cold winter. The sum of positive temperatures above 10° reaches 1500-2800°, with a period of 100-160 days. The average July air temperature is 15-22° C, and the absolute minimum temperature descends to -36° C. The amount of precipitation for the year fluctuates from 450 to 700 mm, and only 300-450 mm falls during the warm season. The coefficient of atmospheric humidification is 0.20-0.55.

Mountainous low-humus Chernozems predominate in the soil cover. Small areas are occupied by Dark chestnut and Acrisols, Cambisols of various degrees are eroded stony low-power soils, and in the upper zone Chernozems pass into Phaeozems and Umbrisols, Leptosols [20]. Forests in this territory occupy small areas and are mainly represented by dry-loving breeds.

Cattle breeding is the leading branch of the agriculture in the region. Field cropping is represented by the cultivation of cereals. Among the activities aimed at raising the productivity of soils, special attention should be paid to the land improvement, the removal of stones from the soil profile, the creation of massifs and the prevention of flushing of the soil.

Five agro-production groups have been outlined in the region.

The group of Dark chestnut of residual-carbonate cultivated soils of gentle slopes occupies the territory of dissected slopes and watershed plateau-forming areas. They are mainly medium-power and are characterized by loamy texture, weak and medium erosion. Soils are mainly used for field and fruit crops. For the improvement of their productive characteristics, it is necessary first of all to introduce soil

protection and agro-meliorative techniques of the organization of the territory.

Group Dark chestnut, Chernozems and, partially, Acrisols of sloping and steep slopes are mostly low-power, weakly and medium-eroded and are often covered by outcrops of bedrock.

For the improvement of their use, it is necessary to carry out surface improvement of the territory.

The group of Acrisols carbonate and typical, as well as Chernozems carbonate of sloping and steep slopes are mostly stony, low-power, loamy, medium-eroded, and for the improvement of their use it is necessary to implement agro-meliorative and soil protection measures (the formation of buffer strips, elimination of small mudflow channels, the running of drainage canals).

The group of Acrisols leached are mainly degraded, underdeveloped soils and Chernozems Leached, characterized by the low and medium power, stony, gravelly-loamy mechanical composition, medium and strong erosion. They are mainly used as pastures. For the improvement of their use, it is necessary to establish a cattle grazing system and apply soil conservation arrangements.

The group of Phaeozems typical, characterized by stony, low power, gravel-sandy-loamy mechanical composition, medium and strong erosion are mainly located on sloping and steep slopes. They are used as pastures and need a superficial improvement.

4. Talin-Kotayk region

The Talin-Kotayk region occupies the territory of the medium-altitude, weakly dissected plateaus, the slanting slopes of volcanic mountains located between the heights of 1500-2500 m above the sea level within the basin of the medium and upper flows of the rivers Azat, Amberd and Selav Mastara. In the relief an important place is occupied by inclined plateaus, weakly and moderately divided slanting slopes, shallow gorges and narrow watersheds, which are mosaically covered with rock outcrops and their debris. The total area of the region is 112.0 thousand hectares or 14 % of the area of the region.

The area is characterized by warm climate, with a warm long summer and a cold winter, where the sum of positive temperatures is above 10° from the lower parts to the upper parts fluctuates from 1200 to 2900°, in case of the duration of the period with the specified temperature of 100-170 days. The frost-free period is small, it makes 80-150 days, and the average monthly temperature in July does not exceed 13-20°C. Under these conditions, the absolute minimum temperature in separate years can decrease up to -37°C. The amount of precipitation for the year from the lower parts of the region to the upper boundaries fluctuates between 450-700 mm, and among them 65-70 % falls on the warm period of the year. The coefficient of atmosphere moisture makes 0.22-0.50.

The soil cover is dominated by Chernozems leached, typical and carbonate. Small areas are occupied by Dark chestnut and Phaeozems.

Approximately 30-35 % of the soils are weakly and medium stony and up to 35 % is eroded.

Agricultural lands in the region occupy 74.0 thousand hectares, or 44 % of the area of the region, and forests in this area do not exceed 4.2 thousand hectares. Agriculture is developed, mainly on the non-irrigated lands; only in the subzone of Dark chestnut and Chernozems carbonate some crops are cultivated under the conditions of optional irrigation.

The production of grain, hay of perennial grasses and natural forage production are the leading branches of agriculture, only in the lower parts of the district small areas are occupied by corn and fruit crops. Meat and dairy cattle breeding and sheep breeding are developed in the upper

subzone, where Phaeozems and Umbrisols (Leptosols) are common [21].

The improvement of protection and the increase of the productivity of agricultural lands are one of the main tasks of agriculture in the region. At the same time, special attention should be paid to the problems of land reclamation and development of stony soils and their inclusion in the agricultural turnover, it is also necessary to apply irrigation with special irrigation technique of irrigation preventing the irrigation erosion of soils in the Chernozems Carbonate subzone, where drought is often observed during the summer period.

Five agro-production groups are distinguished in the region, which are characterized by the following features.

Group of Dark chestnut, as well as Chernozems carbonate of inclined plains and slanting slopes is characterized by low and medium power, loamy-clay mechanical composition, most part of weak erosion. They are distinguished by low humus content and satisfactory agrophysical properties. After cultivation they are transformed and need ameliorative improvement.

The group of cultivated low-humus Chernozems carbonate of inclined plains and slanting slopes is medium-powerful and powerful, clayey, sometimes slightly eroded, it is characterized by a low content of humus, satisfactory water-physical properties and used under crops and perennial grasses. For the increase of their productivity it is necessary to widely use organic and mineral fertilizers, carry out irrigation with the introduction of anti-erosion measures.

The group of Chernozems carbonate, Dark chestnut and Acrisois typical of degraded soils of moderately slanting slopes is characterized by stony, incomplete profile development, low power, loamy mechanical composition, weak and sometimes strong erosion, satisfactory water and physical properties. They are mainly used as pastures.

The group of low-humus profile-stony Chernozems leached and partly Phaeozems typical of moderately slanting slopes is characterized by average power, stony-loamy and clayey mechanical composition, weak and medium erosion. They are also used as pastures.

The group Umbrisols (Leptosols), weak turfy (dark colored, turfy (brown)), which are partially incomplete, are characterized by gravelly stony, low power, loamy mechanical composition, weak or medium erosion. Since they are located on slanting and steep slopes, they are not treated and used as pastures. For the improvement of the productivity of the soils of these groups, it is necessary to carry out the surface improvement and to introduce a corral grazing system.

CONCLUSION

The presented extensive scientific material makes it possible to identify some important provisions and patterns, and to draw a number of conclusions that allow not only to reasonably solve concrete applied problems, but also to use them in planning and implementation of new studies of genetic-geographical classification and agro-production character.

The comprehensive consideration of the needs of agricultural crops in the natural and soil conditions of the territory makes it possible to outline 4 natural-soil areas and 22 agricultural-producing groups of soils in the Ararat region.

The elaborated scheme of the natural and agricultural zoning of the land fund of the republic and the outlined agro-production groups, the characteristics of soil fertility will serve as a scientific basis for the organization and introduction of soil-agronomical, soil-meliorative and soil protection measures on each zoning group contributing to the soil fertility and productivity of cultivated crops of the given region.

The existing complex soil and production conditions require the develop-

ment and implementation of agro-production grouping of soils, the elaboration of systematic measures on thr outlined soil units and proposals for their introduction into production.

The elaborated agro-technical and meliorative arrangements can serve as a scientific basis for proposing more specific activities for subgroups and qualitative categories of soils.

The presented elaborations, in their turn, can serve as a basis for the conduction of further research in the sphere of genesis, zoning, agro-production grouping and the assessment of the soils of the republic.

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ТҮЙІН

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АРМЕНИЯ РЕСПУБЛИКАСЫ АРАРАТ ОКРУГІНІҢ ТОПЫРАҒЫН WSB ЖҮЙЕСІНДЕ ТАБИҒИ АУЫЛ ШАРУАШЫЛЫҚ АУДАНДАСТЫРУ ЖӘНЕ АГРОӨНДІРІСТІК ТОПТАУ

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Жер ресурстарын тиімді пайдалануға, демек ауыл шаруашылығының жалпы дамуына үлесін қосатын бірден бір негіз аумақты дұрыс табиғи ауыл шаруашылық аудандастыру болып табылады. Ғылыми негізделген табиғи ауыл шаруашылық аудандастыру шарушылық саласын дұрыс орналастыруға, мамандануды орындалуына, тиімді ауыспалы егіншілікке, тиісінше ауыл шаруашылық дақылдарды өңдеу және енгізуге, алдыңғы қатарлы агротехникалық, эрозияға қарсы және агромелиоративтік әдістерді қолдануға септігін тигізе алады. Мақалада АР Арарат топырақ округі аумағын табиғи ауыл шарушылық аудандастыру туралы мәселелер қарастырылған. Осы округтің жер қорының топырақ жамылғысын зерттеудегі бар материалдардың негізінде, жаңа зерттеулердің нәтижелері мен нақтылау ауыл шаруашылық аудандастырудың негізінде ауыл шаруашылығы өндірісіндегі жерлерді неғұрлым тиімді зерттеу мақсатында топырақ құнарлылығына сипаттама берілді. Жан-жақты зерттеу негізінде, климат, жер бедері, экспозиция, топырақ түзуші жыныстар, топырақ туралы бар материалдарды қорытындылау, сонымен қатар экономикалық және өндірістік факторларға байланысты АР Арарат топырақ округінің табиғи ауыл шаруашылық аудандастыру және агроөндірістік топырақты топтау сызбанұсқасы жасалды, белгіленген табиғи-топырақтық аудандар мен топырақ топтарының құнарлылығына сипаттама берілді және де жердің өнімділігі мен құнарлылығын арттырудың негізгі жолдары ұсынылды. Бұлар Республиканың жер қорының өнімділігін арттыру мен пайдануды жақсартуда қарастырлаған агрозоотехникалық, мелиоративті, агромелиоративті және топырақты қорғау іс-шараларын жоспарлауда пайдаланылады деп белгіленді. Топырақ Әлемдік Реферативті База (WRB) жүйесінің топырақ ресурстары критерийлеріне сәйкес келетін Армения Республикасының жаңа топырақ классификациясы мен номенклатурасы ұсынылды.

Түйінді сөздер: табиғи-топырақтық аудан, топырақ агрономикалық тобы, гипсометрикалық белгі, суару эрозиясы, тығыздалу, топырақтың екіншілік тұзденуі, суару.

РЕЗЮМЕ

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ПРИРОДНО-СЕЛЬСКОХОЗЯЙСТВЕННОЕ РАЙОНИРОВАНИЕ И АГРОПРОИЗВОДСТВЕННАЯ ГРУППИРОВКА ПОЧВ АРАРАТСКОГО ОКРУГА РЕСПУБЛИКИ АРМЕНИЯ В СИСТЕМЕ WRB

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Одной из основ, способствующей улучшению использования земельных ресурсов, а следовательно и общему подъему сельского хозяйства, является правильное природно сельскохозяйственное районирование территории. Научно обоснованное природно сельскохозяйственное районирование может послужить основой для правильного размещения отраслей хозяйства, осуществлению специализации, разработке и внедрению рациональных севооборотов и соответствующих сельскохозяйственных культур, применению передовых агротехнических, противоэрозионных и агромелиоративных приемов. В статье рассматриваются вопросы природно сельскохозяйственного районирования территории Араратского почвенного округа РА. На основании существующих материалов по изучению почвенного покрова, результатов новых исследований и детализаций природно сельскохозяйственного районирования земельного фонда данного округа дана характеристика плодородия почв с целью наиболее рационального исследования земель в сельскохозяйственном производстве. На основании всестороннего анализа и обобщению существующих материалов по климату, рельефу, экспозиции, почвообразующим породам, почвам, а также экономическим и производственным факторам, разработана схема природно-почвенного районирования и агропроизводственной группировки почв Араратского почвенного округа РА, дана характеристика плодородия выделенных природно-почвенных районов и групп почв, а также предложены основные пути повышения продуктивности и плодородия земель. Установлено, что они могут быть использованы при планировании агрозоотехнических, мелиоративных, агромелиоративных и почвозащитных мероприятий, предусмотренных для улучшения использования и повышения производительности земельного фонда республики. Представлена новая классификация и номенклатура почв Республики Армения, в соответствии с критериями почвенных ресурсов системы Мировой Реферативной Базы Почв (WRB).

Ключевые слова: природно-почвенный район, агрономическая группа почв, гипсометрический отметок, ирригационная эрозия, уплотнение, вторичное засоление почв, орошение.