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ԲԱՐՁՐ ՏԵԽՆՈԼՈԳԻԱՆԵՐԻ ՏԵՂԵԿԱԳԻՐ
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THE AGRICULTURAL CHARACTERISTICS OF LAND AREAS IN DIFFERENT CLIMATIC AND SOIL CONDITIONS OF ASKERAN REGION

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The agricultural characteristics and zoning of land is of vital significance for its bonneting, economic assessment and, which is more important, for the development and implementation of certain activities of fight against soil desertification in current ecological conditions.

The aim of our research was to study the area of 132 and 173 hectares of brown, clay sand medium capacity soil of Askeran region conditioned by the geographical variety of Artsakh relief for the purpose of zoning and giving the agricultural characteristics of the studied area and suggesting a plan against desertification. As a result it has been found that the relief of the land area is roughly wavy which gradually turns mountainous especially in the territory of Akhnaghbyur –Sarushen.

The soil is very poor with both humus and nutrients necessary for plants (NP), it is infected with different types of weeds, plant diseases and pests, farming is maintained mainly under dry conditions, rotation is not applied with its corresponding stages, animal breeding is going on extensively as a result of which crop yield and livestock productivity in rural farms continue to stay low and there is a threat of soil desertification.

Key words: humus, humic, nutrients, relief, plant and animal diseases, weediness, agrochemical characteristics, land zoning.

Introduction

As it is generally common to the mountainous areas, the relief of the studied territories is rough. The great variations in the relief and the slopes determine the diversity of climate, water, soil cover, wildlife, natural landscape and land zoning.

Due to the contradictions of the relief the climate is various. Meteorological elements characterizing the area are mainly dependent on the geographical location of the area, the total circulation of the atmosphere, the penetrating air masses, the nearby Caspian Sea, the altitude of the sea, the support of the mountain range and other factors.

Taking into account the change in air temperature, moisture, relief and other elements in Astghashen (132 ha) we have distinguished temperate warm and dry climatic zone and in Aknaghbyur-Sarushen (173 ha) area we have noted temperate warm and humid climate. The first zone has warm summers and the winters have no severe cold. In January the average temperature is $+1^0$ C - -1^0C and in July the average is $+21\text{-}25^0$ C.

Absolute minimum can reach to -20^0 C and the absolute maximum can be $+30\text{-}40^0$ C. The annual long term average precipitation is 400-500 mm.

The second zone has temperate warm and humid climate, the summer is temperate warm, the average temperature in July is not more than $+24^0$ C and winters are not frosty. The average temperature in January is not less than -3,5°C. The annual precipitation is 500-600 mm, the maximum is in spring (May – the first half of June) and the minimum is in winter [1, 2] (Table 1).

As you see in the first diagram, in the first climatic zone the average temperature in January is +1°C and the average in July is +23,8°C.

In the second climatic zone we have -0-2 and +22,4°C.

The average perennial of precipitation in Astghashen is 497 mm, the maximum is in May as 94mm, the minimum is in December-January as 15mm.

The average annual in Aknaghbyur - Sarushen is 643 mm, the maximum is in May as 122 mm and the minimum in December – January is 27 mm.

Polar days are 2200-2300 hours. This zone is noted by less clouds (34-37 days). Clear days are more in summer. The winter is mild. We have stable snow cover n the northern and east-northern slopes of Aknaghbyur-Sarushen region.

The wind direction is mainly towards the mountain valleys. The average speed of wind is small in the studied area and doesn't exceed 1,5-3,0 m/sec. In winter it blows 3,4 - 4 m/sec and in summer it is 1,5 – 2 m/sec.

Among the risk factors of climatic conditions there is frostbite, hailstorm and drought which occur periodically. Dry tropical dusty wind blows into the region in spring and summer months from Middle Asia causing significant fluctuations in the weather especially drought. Often these hot winds have a negative impact on vegetation. The northern air masses bring spring and autumn frosts that also negatively affect the agriculture [1,2].

In the mentioned climatic conditions of Astghashen zone where the temperature is higher and the precipitation is lower, dry resistant crops are dominant and also bush frigid plants are growing. The lands being formed under such vegetation are classified as forest brown, mountain light brown, brown and dark brown soils on the map of the Republic of Artsakh based on the results of the studies conducted by the Armenian "State Soil Construction Project" Institute. In the zone of Aknaghbyur – Sarushen with lower temperature and more humid climatic conditions there are bushes and grass among other crops which gradually turn into small forest along the increasing height. Under such conditions the composition of the soil varies from the clay medium to the clay rocks according to the same soil map [3].

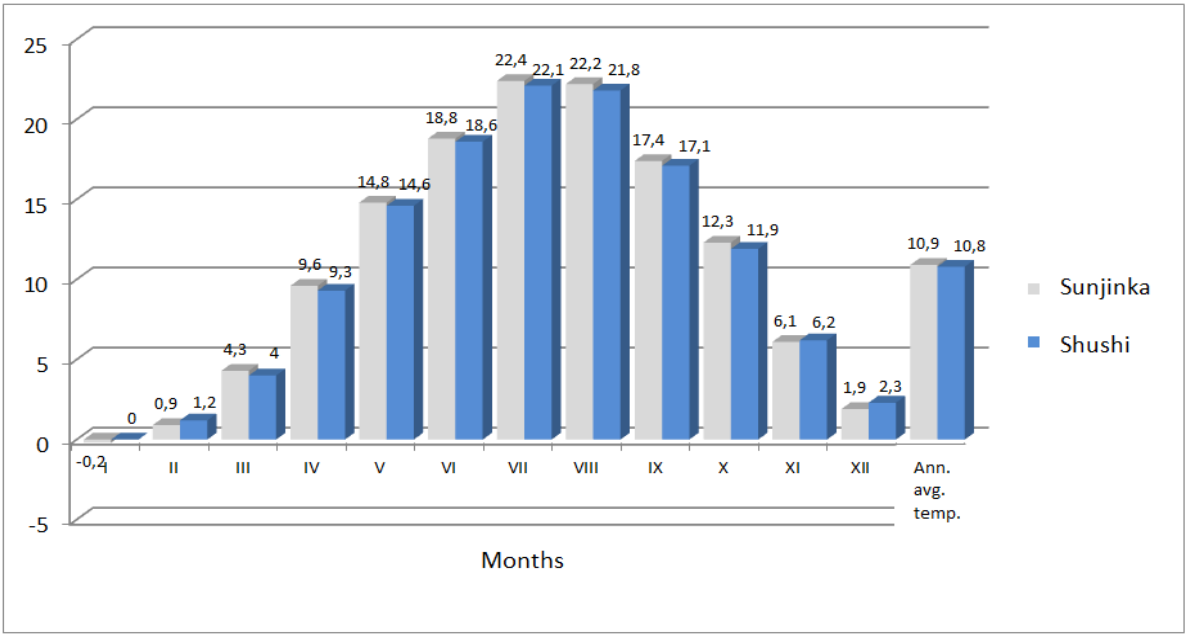

Fig. 1 Annual average and monthly average temperatures of the air (^{0}C) according to the data of Sunjinka and Shushi hydrometeorology station

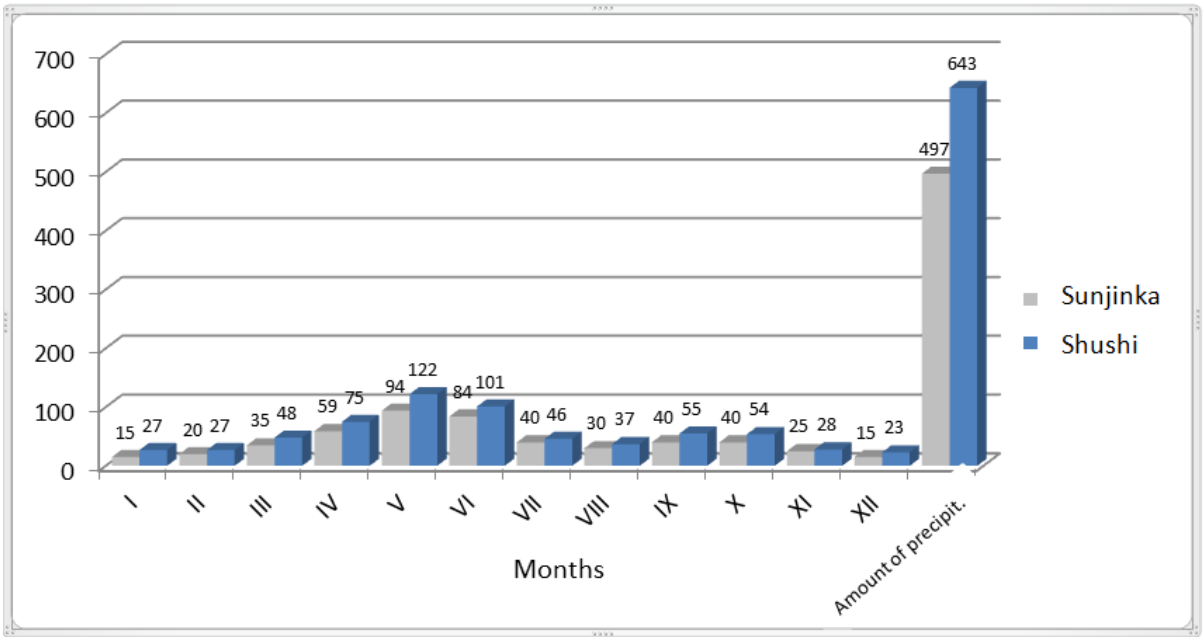

Fig. 2 Monthly and annual average rates of atmospheric precipitations (mm) according to the data of Sunjinka and Shushi hydrometeorology station

Conflict setting

In this zone the first of the most important factors in the life of the plants are the water and nutrients. In the case of balanced use of organic and raw fertilizers under irrigation high yields of field, crop and perennial plants are expected. However, both the moisture and the nutrients in the condition of drought are in direct dependence not only on climatic conditions but also on land relief which is one of the key factors of the land formation process and has great impact on the formation of its fertility.

The development of plant species, animals and micro-organisms and their impact on the processes of land cultivation are due to different climatic conditions. However, in the mountainous areas, including the studied areas, there is another not less important factor - the relief which is characterized by the outer form of the surface, size, altitude, slope and degree of slope etc.

In case of hard relief quite different land and climatic conditions are created compared to flat areas. If the precipitation is almost completely absorbed into the soil in flat areas, much of the precipitation on the mountain slopes is in the form of surface waters flow to the lower parts of the site. On different slopes (sunny and shady) no similar soil and climatic conditions are created, as the light and heat regimes are quite different. Evaporation on the sunny slopes is more intensive than on the shady ones. This phenomenon has its impact on the intensity of creation of vegetation biomass, the intensity of decomposition of its dead residues and hence the direction and depth of soil formation. In the same amount of rainfall the shady slopes are more humid, vegetation is more lush, more fertile soils are formed and soil erosion processes are relatively weaker than those on sunny slopes.

Relief is important not only for the clarification of the processes of soil formation but also for the agricultural characterization of the area. The productivity of agricultural vehicles and transport, the system of used machinery, the nature of the anti-erosion measures during agricultural work etc. are directly dependent on the relief [4].

Besides the vital factors of life, weeds, pests and diseases which are spread in the fields and gardens have significant impact on crop yields and quality indicators of the products.

The purpose of our research is to implement the geodesic surveys which reflect the relief elements of forest brown carbonate gravel soil and forest brown clay soil in different climatic zones of Askeran region conditioned by the diversity of geographic relief of the Republic of Artsakh (132 and 137 ha), to give the agrochemical characteristics of those regions through laboratory research which will be the basis for developing and implementing a scientifically justified fertilizing system.

The geodesic survey of 131 hectare land was done by 1:1000 scale the coordinates of the point in the middle of the land in Arm WGS system Y=8648497,118, X=4423654,597, H=731,330, the decline of axis 0,5 m, height system Baltic 1977. To give the agrochemical description of the soil the area was divided into 10 and 8 hectare sections from south to north from each of which 20 samples were taken. These 20 samples were mixed with each other and as a result 20 and 13 average samples were obtained which were subjected to chemical study.

The weediness of the fields was determined by eyesight and 4 grade column of A. I. Maltsev. The degree of infected plants and pests was determined by 5 and 6 grade column respectively [5].

Taking into account the fact that the second important branch of agriculture in this zone is considered livestock breeding, we have identified the causes of low livestock production, the varieties of illnesses preventing the development of livestock based on surveys, statistical rates and scientific literature and we have also found out that it is impossible to imagine the further development of livestock without preventive struggle against them and scientific treatment of these diseases.

Research results

The research showed that the primary study of the survey in one area was 131 hectares and in the second it was 171 ha. 132 ha and 171 ha soil area hectares were factually surveyed. The first area of the investigation is at an altitude of 705,81 meters above sea level and the second is at 842 m (the lowest point is 671,38 meters, the maximum is 751,51 meters). Relief in the first area is a wavy area that turns into mountainous in the northern part in the second.

The total length of the boundaries of the territory is 9270 m, from which 2500 m stretches along Stepanakert - Drmbon highway. The maximum length of the area is 2700 m to the south from the east, the largest from the east to the west is 670 m and the narrowest place is 440 m.

In the second area the total length is 6639,7 m from which 480,6 m stretches along Stepanakert – Hadrut highway.

The maximum length of the area is 2660m from north to south, from east to west it is 918 m in the widest and the narrowest is 600m. 16, 8 ha forest is involved into this area. From 173 ha of land under study 86 is located in Aknaghbyur and 87 ha in Sarushen soil balances.

The results of the agrochemical analysis of 132 and 173 hectares of land, according to the samples given in Table 1 and 2, show that the mechanical composition of the first soil changes from clay sandy heavy into medium clay sandy, PH is weak alkaline (7,03-7,3), CaCO3 is absent, the content of water solvent salts varies between 0,025 and 0,043% and the second soil area which was formed in more humid and in lower temperature has mechanical composition of mainly medium sandy, PH- is from weak acid to weak alkaline (6,7-8,5), $CaCo_3$ is 0,95-19,1 %, salt solvents is between 0,031-0,059%. The diagrams in Fig. 3, 4 and 5 show that the plot formed in the conditions of different relief conditions and climatic zones has various chemical composition.

The data on humus content in the soil samples shown in Fig. 3 show that in relatively hot and dry climatic conditions humus content in wavy lowland is between 2,51-5,09%. In 38,4% of soil samples humus content was 3,76-3,82% in 30,8% 5,04-5,09% in 30,8% and in 30,8% it comprised 2,51-2,56%.

In the second plot (173 ha) which was formed in more humid and mild temperature conditions of the mountainous rough relief, the following data were recorded in these same indices: in 55% of soil samples humus content was 1,81-2,91%, in 30% - from 3,41 to 3,97% in 15% from 4,01 to 4,21%. This is the result of wavy and rough mountain relief in which soil erosion processes have different speed and directions.

According to the diagram of Fig. 4, the nitrogen available to plants varies from 1,26 to 2,56 mg in 100 g soil, P_2O_5 from 0,87-1,44mg, K_2O from 38,83 -42,86 or 132 hectare in average contains 1,91 mg nitrogen in 100 g soil, 1,15 mg P_2O_5 and 38,34 mg of 1 K_2O in 100 g soil.

Meanwhile, the samples containing 1,26-1,92 mg in this area comprised 69,2% and in 2,53-2,56 -30,8%. In 53,8% of samples containing phosphorus its amount was about 1,11-1,44 mg and in

46,2 % it is 0,78-1,10 mg P_2O_5 was in 100 g of soil. The content of calcium in 100 g of soil was high between 33,83-34,97 mg and in 37,60-42,86 mg sample containing calcium it was 46,2%.

In the second (173 ha) soil which was more proper with nitrogen in 100 g soil containing 4,8-7,15 mg nitrogen, the samples comprised 65% and 2,78-3,5 % containers 35%. In 55 % of samples of P_2O_5 it fluctuated between 0,65-1,0 and in 45% it reached 1,01-3,2 mg, in 50% of samples containing K_2O it fluctuated between 26,60-32,68 and in 50% -in 36,75-59,75 mg.

Meanwhile, according to the limiting numbers adopted in the RA, the soil is considered weak in nitrogen when the nitrogen in the 100 g soil is 8 mg, medium soils 8-12 mg and in strong soils 12 mg or more. According to Mashingin, the soils are considered weak in phosphorus when phosphorus is available in 100 grams of soil up to 3 mg in medium, 3-6 mg and 6 mg or more in strong soils. According to the classification adopted in Armenia soils are considered to be weak in calcium when available calcium comprises 18 mg in 100 g, if 18-36 mg, then the soil is considered to be medium supported and in case of 36 and more it is considered to be well supported.

Based on the above mentioned measures, we can say that both lands under study are considered to be poor in nitrogen, very poor in phosphorus dynamic compounds and rich in potassium. Therefore, a special place should be given to the application of nitro-phosphorous and organic fertilizers for any crop in any crop rotation for any fertilization system and to the use of potassium fertilizers only under certain crops (potatoes, flax, rootstocks) which are fertilized by potassium.

The data on the contents of Ca^{2+} and MG $^{2+}$ ions are brought in diagram in Fig. 5 and show that in 132 hectare area the content of Ca^{2+} ion fluctuates between 0,29 – 0,70 mg/ equiv. in 100g soil %, and Mg^{+2} ion is 0,15-0,83 mg/ equiv. For 173 hectare soil the rates of the same index are the following: Ca2+ ion content is 0,29-0,90, Mg2+ -is 0,01-0,67 mg/equiv. in 100 g of soil.

Thus, in the first soil land 0,29-0,49 mg/equiv. in 100g soil % making the number of samples containing Ca2+ ions was 69,2%, and 0,5-0,7 mg/equiv. in 100 g soil % making is 30.8%. In the second area the rates of the same index comprised 0,29-0,50 mg/equiv. in 100 g soil % was 55 %, 0,51-0,90 mg/equiv. in 100 g. soil is 45%.

In the case of Mg2+ ion the 53.8 % of the samples the content of the ions fluctuated from 0,15 - 0,17 mg/equiv. in 100 g, in 46,2% it is 0,32-0,38 g/equiv. in 100 g soil.

In the second area in 55% it is 0,01-0,30, in 45% it is 0,32-0,67 g/equiv. in 100 g soil.
Both cases record the content of Ca2+ ions is higher which is positive from the point of view of preserving the stability and formation of soil aggregates [6].

Research on the species composition and prevalence of weed in vegetable crop diseases and pests has revealed that many weed species, which are root parasites, are highly harmful to tobacco, sunflower and cabbage. Stem parasites are spread from various types of weed mint which are parasitic on alfalfa, potato, cigarettes, currants, raspberries, beetroots, fruit trees and shrubs. Non-parasitic weeds are subdivided into the annuals and perennials. Among annuals wild oats, goosefoot, joint weed, false carrot, amaranth, palm grass, purslane, bitter thorn, garbage plant, boomrape etc. and from perennials we have banewort, plantain, dock, dandelion, sage-brush, field gem, lesser bindweed, couch grass, weed sorghum etc. are common here [7].

Table 1

The results of agrochemical analyses of 132 hectare land area according to soil samples

Name of soil sample	Mechanical composition	Humus %	PH	$CaCO_3$	Water solvent salts content %	Water survey, mg/eq in 100 soil %		The available nutrients in plants, mg 100 g soils		
						Ca^{2+}	Mg^{2+}	N	P_2O_5	K_2O
1	2	3	4	5	6	7	8	9	10	11
132-1	Clay sand heavy	5,06	7,03	no	0,034	0,5	0,16	2,54	1,33	37,6

1	2	3	4	5	6	7	8	9	10	11
132-2	Clay sand medium	3,78	7,7	no	0,038	0,4	0,33	1,9	1,10	40,61
132-3	Clay sand heavy	2,53	7,4	no	0,033	0,51	0,17	1,27	1,00	33,84
132-4	Clay sand medium	5,07	7,4	no	0,03	0,3	0,15	2,55	1,44	34,96
132-5	Clay sand medium	3,80	7,2	no	0,025	0,29	0,16	1,91	1,11	33,83
132-6	Clay sand medium	2,54	7,2	no	0,029	0,49	0,32	1,28	0,78	41,36
132-7	Clay sand light	2,51	7,5	no	0,043	0,41	0,33	1,26	1,43	38,35
132-8	Clay sand medium	3,76	7,7	no	0,042	0,39	0,17	1,89	1,22	42,86
132-9	Clay sand medium	5,04	7,4	no	0,028	0,31	0,17	2,53	1,09	34,22
132-10	Clay sand heavy	5,09	7,2	no	0,022	0,4	0,50	2,56	1,08	34,21
132-11	Clay sand heavy	3,82	7,3	no	0,031	0,5	0,15	1,92	1,12	34,59
132-12	Clay sand heavy	3,78	7,0	no	0,032	0,41	0,83	1,9	1,01	40,6
132-13	Clay sand medium	2,56	7,3	no	0,038	0,7	0,32	1,29	1,23	34,97

Table 2

The results of agrochemical analyses of 173 hectare land area according to soil samples

Name of soil sample	**Mechanical composition**	**Humus %**	**PH**	**$CaCO_3$**	**Water solvent salts content %**	**Water survey, mg/eq in 100 soil %**		**The available nutrients in plants, mg 100 g soils**		
						Ca^{2+}	Mg^{2+}	N	$P_2 0_5$	K_2O
1	2	3	4	5	6	7	8	9	10	11
173-1	Clay sand heavy	7,3	2,71	15,3	0,048	0,31	0,3	4,83	1,01	30,8
173-2	Clay sand medium	7,3	2,91	16,4	0,035	0,52	0,01	7,15	1,83	38,16
173-3	Clay sand heavy	8,5	2,03	18,8	0,046	0,29	0,65	5,3	0,79	26,6
173-4	Clay sand medium	6,8	3,41	6,5	0,059	0,5	0,04	5,5	1,51	38,74
173-5	Clay sand medium	7,2	2,52	17,7	0,039	0,47	0,34	5,31	0,84	28,28
173-6	Clay sand medium	6,7	4,01	9,85	0,046	0,89	0,08	6,83	1,17	39,02
173-7	Clay sand light	6,8	2,8	13,2	0,041	0,6	0,05	5,29	0,85	26,88
173-8	Clay sand medium	8,1	2,65	17	0,045	0,39	0,48	2,83	0,67	30,81
173-9	Clay sand medium	7	3,78	1,5	0,031	0,53	0,06	2,8	0,65	31,24

1	2	3	4	5	6	7	8	9	10	11
173-10	Clay sand heavy	7,2	3,97	10,7	0,034	0,55	0,02	3,5	1,07	44,15
173-11	Clay sand heavy	7,6	2,88	17,2	0,045	0,5	0,5	5,28	3,2	56,18
173-12	Clay sand heavy	6,7	2,47	18,6	0,035	0,4	0,51	5,52	2,16	34,71
173-13	Clay sand medium	8,3	1,81	19,1	0,039	0,51	0,66	3,48	1,5	59,75

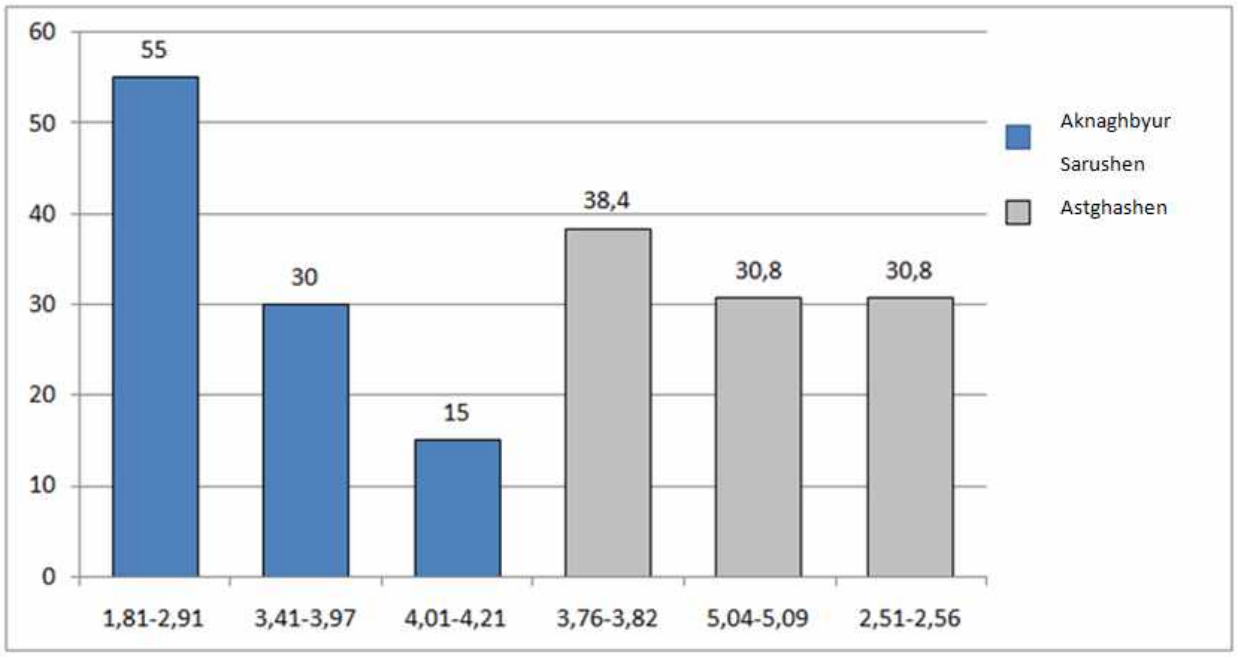

Fig. 3 Humus content in the soil samples (%)

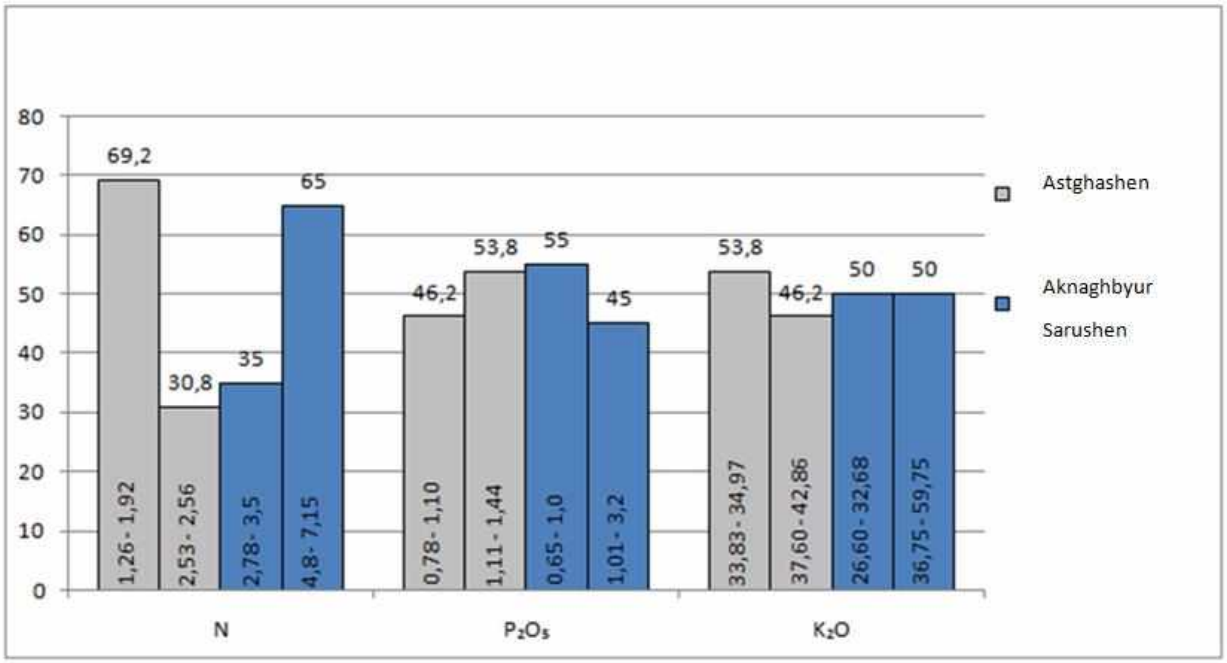

Fig. 4 The nutrients available to plants (mg) in 100g soil

Among the common diseases threatening the cereals in the region are cereal smut, stone smut, rusts, flour powder, mycosphaerella, corn smut and corn rust.

Phyto furosis is one of the common diseases of potato which is expressed on the leaves and blisters. In the region cereals are damaging by the beetle, grain turtle, cereal aphids, Hensen flies, Swedish flies, corn butterflies, corn moths, beetle worms, locusts, grigs, field mice etc.

Potatoes are damaged by colorado beetle, worms, ordinary mole cricket and so on. The most common vegetable diseases are black legs, fruit peak rotting, cereal smut, stone smut, rusts, flour powder, mycosphaerella, corn smut, corn rust and among viral and phytoplasmic diseases mosaics, stolburs etc. are common.

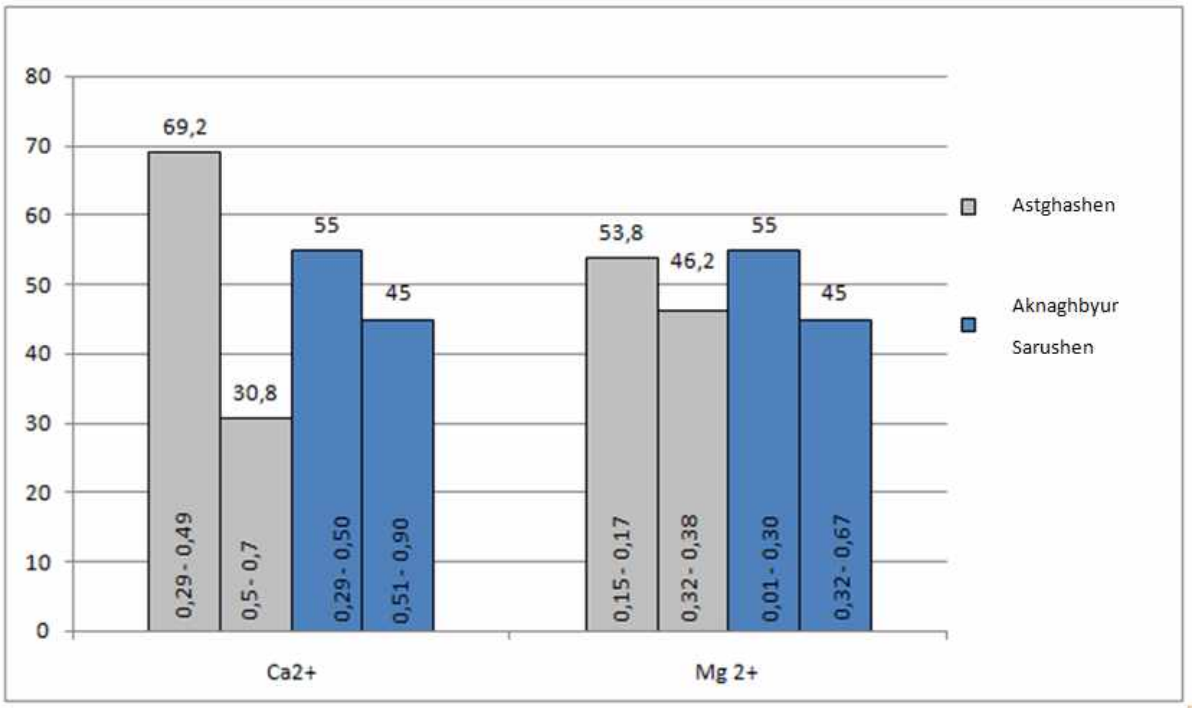

Fig. 5 In water survey, mg/equiv. in 100 g soil (%)

The vegetable crops in the region are largely damaged by the ordinary mole cricket, Colorado Beetle, soil moths, cabbage white butterfly and aphids.

The study showed that mange of pomes, moniliose, erysiphaceae, black cancer, drupe moniliose, gummosis, porosity, leaf curliness etc. are among the common diseases that threaten fertility in the region.

Among the fruit pests are totrix moths, flower moths, aphids, moths, billbags etc.

In the region surveyed grapes are infected with mildium and oidium and pests are mainly grape moths [8, 9].

Organization of feedstock base in creating conditions for the proper breeding of the livestock is one of the most urgent issues. The creation of a warehouse for natural herbs is particularly important which, besides being the most important resource for the organization of fodder is also of utmost importance for the overall biodiversity. Despite the fact that the total number of animals has declined considerably over the last 25-30 years in new economic conditions, however, in case of irregular and improper use and the lack of necessary care and improvement measures this resource has been endangered leading to a sharp rise of degradation, decrease of the rate of spatial growth of the plants and level of fertility, leveling of stony and foliage [10]. The yield in the pastures is only 35-40 c/ha of green mass and in the grasslands which are at the foot of northern slopes, the yield fluctuates within the limits of dry grass 10-15 c/ha. The number of livestock in pastures varies between 150-200 conditional headings. One conventional head gets 2,5-3 hectares of pastures, which, even under such

low reproduction, are sufficient to provide high levels of productivity. However, livestock productivity indicators in the region remain low, due to inefficient use of natural habitat and lack of adequate quantities and quality of nutrition for the feeding rack.

The breed of cattle here is the Caucasian gray which has lost its tough tribal qualities as a result of many years of irregular and mixed crossing and gives low yielding (800-900 l) of milk. The main breed of sheep is the Karabakh breed, which, under conditions of inadequate feeding and poor behavior often does not express its breed potential. Although pig breed is openly forbidden by law, the region continues this unacceptable process.

Parasitic, infectious and non infectious diseases also hinder the development of livestock breeding.

The diseases registered in the region by 2018 are common to both Artsakh and the Republic of Armenia.

The region registered heamitosis diseases like fascioliasis, dichrocyeliosis, birds prosthogonimus, Monieziosis, pigs finoze, echinococcus, sheep gid, sheep dictycaulosis, ascariasis of pigs, birds heterocigosis, among protozoan diseases piroplasmosis and theileriosis of cattle.

Infectious diseases registered in the region include brucellosis, gastric tuberculosis, pasteurosis, anthrax, diarrhea, bradzot, tuberculosis, bird plague, pig bladder, African pig plaque, rabies etc.

Among the non infectious diseases registered are sharp edema of the cutter, cramps, dyspepsia and clogging [11].

Conclusions and suggestions

Consequently, studying the relief conditions of 132 and 173 hectare land areas in different climatic zones and giving their agricultural characteristics, we came to the following conclusion:

1) Implementation of the efforts of minimum development will fail if it is not secured or insufficiently provided by any of these links (crop rotation, fertilization, struggle against weed pests and diseases, machines, seeding).

2) Replacement of the traditional land-based desertification system with a new system of minimal cultivation as the depth of soil cultivation, the intensification of the bedrock and the increase in the number of operations in the conditions of traditional farming contribute to the occurrence of such negative phenomena such as destruction of soil aggregates, acceleration of decomposition rates, dust removal of the treated layer, loss of moisture, acceleration of erosion, increase in labor and material costs etc.

3) Development of the proposed minimal processing system whose main and decisive linkage is the development of the soil without the need to rely on the principle of reducing the depth of processing and decreasing the number of operations which is free from the above mentioned negative phenomena.

4) For many years in the case of not systematized fertilizing conditions the humus supplies of the organic part of the soil decreased and one of the main laws of agriculture as return law was violated.

Taking into account the above mentioned we suggest:

1. To replace the system of traditional soil cultivation with the minimal cultivation which is widespread in many countries of the world.

2. The use of perennial papilionaceous herbs is a powerful and irreplaceable agro technical measure especially in this area which simultaneously solves a number of problems, improves the agro-physical characteristics of the bedrock, reduces costs for fertilization and plant protection chemicals and prevention of the erosion process. Including the perennial herbs in the sowing process will also be a stimulus for the development of intensive livestock breeding.

It will also solve a very important ecological issue which is the prevention of soil erosion and abolition of the threat of desertification.

3. When developing a scientifically-based fertilization system and determining the amount of mineral fertilizers under the crop will be guided by the best method of determining the quantities that contribute to maintaining and increasing soil fertility during crop rotation and providing superior crop yield and maximum benefit [12].

We suggest the following in the field of animal breeding:

a) Long term mixed cross breeding and bad feeding led to the lost of best breeding peculiarities of the cattle and low productivity.

b) Due to ineffective use of pastures and cultivation of feed plants the cattle is not fed properly during pasture and nursery period.

c) Though pig breeding had been continuously considered one of the profitable branches of animal breeding during the mentioned period, however, for the risk of infection of African pig plaque the number of pigs decreased significantly.

Based on the created situation we suggest:

1. In order to provide complete livestock feeding in the pastureland to perform cultural-technical improvement of natural pastures, to water the pastures and to feed the cattle in lawns. To establish a sustainable feeding base for the nursery period including feeding crops into the planting. To provide condensed feeds for all kinds of animals at a rate of 20-30%.
2. To gradually replace the existing hybrid cattle of low productivity with well bred cattle of high productivity which are bred in Askeran breeding station.
3. To breed pigs exceptionally in close and yard conditions.
4. To develop and apply corresponding preventive and curing activities against infectious risky diseases which had recently been observed.

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ԱՍԿԵՐԱՆԻ ՇՐՋԱՆԻ ՏԱՐԲԵՐ ՀՈՂԱԿԼԻՄԱՅԱԿԱՆ ԳՈՏԻՆԵՐՈՒՄ ԳՏՆՎՈՂ ՏԱՐԱԾՔՆԵՐԻ ԳՅՈՒՂԱՏՆՏԵՍԱԿԱՆ ԲՆՈՒԹԱԳԻՐԸ

Ս.Բ.Գալստյան[1], Ս.Կ.Երիցյան[2], Թ.Գ.Գրիգորյան[1], Ա.Ա.Առաքելյան[1]
[1]Շուշիի տեխնոլոգիական համալսարան
[2]Հայաստանի ազգային ագրարային համալսարան

Հողերի գյուղատնտեսական բնութագիրն ու գոտիավորումը կարևոր նշանակություն ունեն դրանց բոնիտման, տնտեսական գնահատման և, որ չափազանց կարևոր է, էկոլոգիական ներկայիս պայմաններում հողերի անապատացման դեմ պայքարի միջոցառումների մշակման և իրացման գործում:

Հետազոտության նպատակն է Արցախի Հանրապետության աշխարհագրական ռելիեֆի բազմազանությամբ պայմանավորված՝ Ասկերանի շրջանի տարբեր հողակլիմայական գոտիներում գտնվող անտառային դարչնագույն կարբոնատային խճաքարային և անտառային դարչնագույն կրազերծված կավայնացված հողամասերում (համապատասխանաբար 135 և 173 հա) գոտիավորման նպատակով տալ այդ տարածքների գյուղատնտեսական բնութագիրը, առաջարկել անապատացման դեմ տարվող միջոցառումների պլան: Արդյունքում պարզվել է, որ ուսումնասիրվող հողատարածքների ռելիեֆը բարդ ալիքավոր է, որը հատկապես Ակնաղբյուր-Սարուշեն տեղամասում դառնում է լեռնային:

Հողերը, ինչպես հումոսի, այնպես էլ բույսերին անհրաժեշտ սննդատարրերի (N;P) պարունկությամբ աղքատ են, ցանքատարածությունները վարակված են մակաբույծ և ոչ մակաբույծ սակավամյա և բազմամյա մոլախոտերով, բույսերի հիվանդություններով և վնասատուներով, երկրագործությունը վարվում է հիմնականում անջրդի պայմաններում, չեն կիրառվում ցանքաշրջանառություններ իրենց համապատասխան օղակներով, անասնաբուծությունը վարվում է էքստենսիվ եղանակով, որի պատճառով մշակաբույսերի բերքատվությունը և անասունների մթերատվությունը շարունակում է մնալ ցածր, կանխատեսվում է անապատացման վտանգ:

Բանալի բառեր. հումոսայնություն, սննդատարրեր, ռելիեֆ, բույսերի և կենդանիների հիվանդություններ, մոլախոտվածություն, գյուղատնտեսական բնութագիր, գոտիավորում:

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СЕЛЬСКОХОЗЯЙСТВЕННАЯ ХАРАКТЕРИСТИКА ТЕРРИТОРИЙ, НАХОДЯЩИХСЯ В РАЗНЫХ ЗЕМЕЛЬНО-КЛИМАТИЧЕСКИХ ЗОНАХ АСКЕРАНСКОГО РАЙОНА

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Сельскохозяйственная характеристика и зонирование земель имеют важное значение в деле их бонитации, экономической оценки и, что крайне важно, разработки и реализации мер по борьбе с опустыниванием земель в нынешних экологических условиях.

Цель исследования - дать сельскохозяйственную характеристику лесных коричневых карбонатных щебнистых и лесных коричневых глинистых участков (соответственно 135 и 173 га) в разных земледельческих зонах Аскеранского района с целью зонирования этих территорий, предложить план мероприятий против опустынивания. В результате исследования выяснилось, что рельеф изучаемых земельных участков -сложный волнистый, который особенно на участке Акнахбюр-Сарушен становится горным.

Изучаемые участки бедны как гумусом, так и необходимыми для растений питательными веществами (N;P), посевные территории заражены паразитными и непаразитными малолетними и многолетними сорняками, болезнями растений и вредителями, земледелие ведется в основном в неорошаемых условиях, не применяются севообороты в соответствующих звеньях, животноводство ведется экстенсивным способом. В результате этого урожайность культур и продуктивность скота продолжают оставаться низкими, прогнозируется опасность опустынивания.

Ключевые слова: гумус, питательные вещества, рельеф, болезни растений и животных, сорняки, сельскохозяйственная характеристика, зонирование.

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THE ESTIMATION OF MECHANICAL REMOVAL OF SLOPE SOIL

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The process of interaction of working organ and the soil has been studied to investigate the mechanism of soil removal in slopes and to prevent it. A mathematical model for evaluating mechanical soil removal in the slopes has been developed to determine the dimension of the movement of the soil (drill) removal both down and up depending on the slope and the change of the technological parameters of the working organ. Such equations were obtained by the application of which the slope removal will be prevented by the regulation of structural and kinematic parameters of the working organs of cultivating machines.

Key words: slope, soil erosion, furrow, spike, plowshare, drill, shift, parameter, trace.

Introduction

Landscape agriculture has not developed yet but it has quite sufficient amount of supplies in enlarging the additional production of highly qualified agricultural products.

The slope soils are subjected to intensive erosion and if necessary steps are not taken, those soils may become useless causing significant economic damage to agriculture.

It is necessary to study the procedure of interaction of working organ and soil for investigation and prevention of soil removal mechanism in slopes especially in case of relative removal of the soil over the surface of working organ.

Conflict setting

Many researchers have dealt with the studies of working organs of soil cultivation and soil interaction [1,2,3,4,5,6] taking into account the theories of V.P. Goryachkin and his followers about the interaction of soil and spike (two layered and three layered). However, there is still no definite consistent approach for determining the trace of soil removal over the working surface of spike. Some scientists think [3,5,6] that the soils move towards the furrow stood by the pedal of spike and some find that [8,9,10] the soil trace passes through the plowshare to the pedal.

Generally, the trace of relative movement of soil over the working surface of spike is suggested by η angle of cutting edge of plowshare (Fig.1) which, according to L. V. Gyachev [3] is defined by the following expression

$$tg\eta = tg\gamma \cos\varepsilon, \quad (1)$$

where ε is the angle of working surface of plowshare and furrow bed, γ is the angle of cutting edge and direction of soil removal.

While projecting the working organs of cultivating machines it is not accounted that these machines should also work in the slopes. Consequently, during the cultivation of these slopes with the working organs the corresponding agro technical requirements are violated resulting the worsening of the cultivation quality.

During the action of the working organ of minimal cultivation of the soil (particularly the arrowhead paw) in the lowlands, the tillage moves to the right and left symmetrically in the direction of movement during which no general movement of the soil is noted. While working on the slopes the soil moves more downslopes than upside resulting in mechanical removal of the soil [4,11,12].

The movement of the soil downslopes is conditioned by the impact of additional forces (Q) on the tillage

$$Q = G\sin\theta,$$

where G-is the weight of the tillage, θ-is the angle of the slope.

Let us theoretically research on the change of soil removal on the slope depending on the slope and the parameters of working organ.

Research results

During the soil cultivation with $ABCO$ trihedral spike the tillage turns to the working surface of the spike by S trace (Fig. 1). The same spike on the slope declines and takes AB_1C_1O position thus changing horizontal and vertical platforms and technological parameters. The trace of tillage movement is also rolling with the spike as a result of which η angle characterizing the spike gets various values in various positions.

The position of spike in space also changes under the impact of angular forces which make the trace of the tillage, declines for some more δ angle and takes AD_1' position.

As we can see in Fig. 1, the movement of the tillage down the slope increses $from\ OE\text{-}\ to\ OE_1'$. Up to the slope the movement decreases.

To determine the dimension of tillage movement we need to have the parameters of the spike.

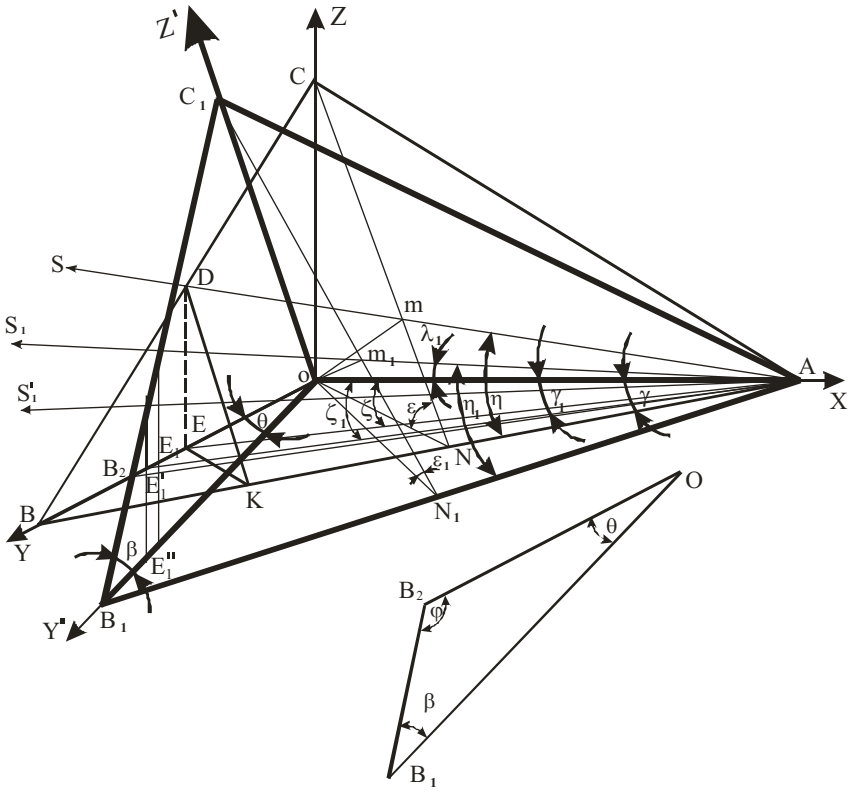

Fig. 1 The scheme of soil removal depending on slope

Taking into account that most working organs of cultivators of minimum cultivation of the soil are arrowhead paws, let us study the working organ with appearance of plowshare of B width which represents a part of trihedral spike (Fig.2).

We can see from Fig. 2 that the tillage movement on the slope is $\Delta_1 = OE_1''$ which can be determined by the following expression

$$\Delta_1 = OE_1'' = AO \cdot \frac{tg\xi_1}{\cos\theta} = AD_1' \cdot \frac{tg\xi_1 \cdot \cos\lambda_1}{\cos\theta},$$

or

$$\Delta_1 = B\frac{tg\xi_1 \cdot cos\lambda_1}{cos\theta \cdot sin\eta_1} \tag{2}$$

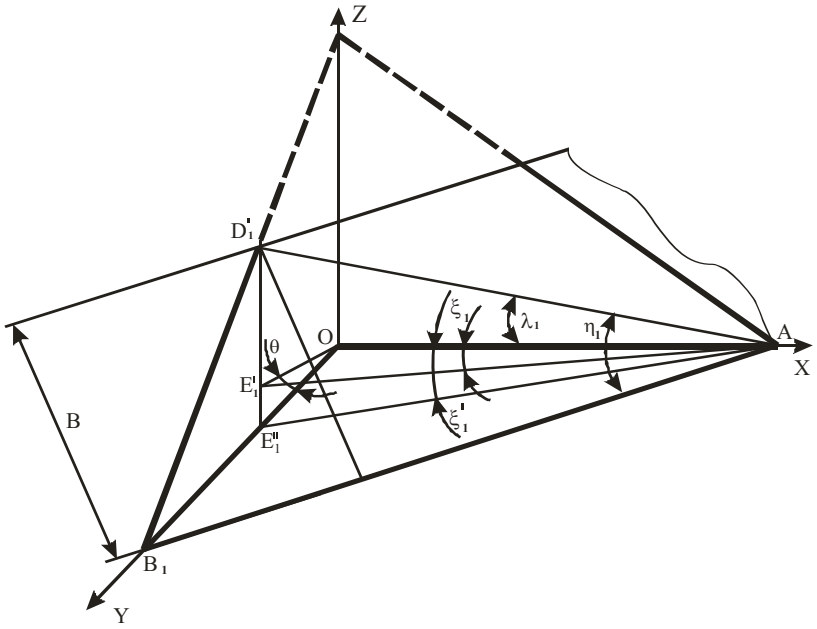

Fig. 2 The scheme of determining the tillage removal on slopes

If the $OABC$ spike (the part of arrowhead paw to down) declines to the width of the slope and takes OAB_1C_1 position, AB_2 line will become the trace of spike surface on OAB platform and γ_1 angle of current value of the angle (the angle of pushing side) depending on slope (θ). Let us determine the value of the angle. According to Figure 1 we can write

$$tg\gamma = \frac{OB}{OA'}, \qquad tg\gamma_1 = \frac{OB_2}{OA} ,$$

where $$\frac{OB}{tg\gamma} = \frac{OB_2}{tg\gamma_1} \Rightarrow tg\gamma_1 = tg\gamma \cdot \frac{OB_2}{OB}$$

Taking into account that = OB_1, we will get

$$tg\gamma_1 = tg\gamma \cdot \frac{OB_2}{OB_1} \tag{3}$$

In

B_1B_2O triangle (Fig. 1) we will use the theorem of sinus getting the following

$$\frac{OB_1}{sin\varphi} = \frac{OB_2}{sin\beta} \Rightarrow \frac{OB_2}{OB_1} = \frac{sin\beta}{sin\varphi} \tag{4}$$

Taking into account formula (4), formula (3) will get the following expression

$$tg\gamma_1 = \frac{sin\beta}{sin\varphi} tg\gamma \tag{5}$$

From OB_1B_2 triangle let us determine φ angle

$$\varphi = 180° - (\beta + \theta), \quad \textit{consequently}$$

$$sin\varphi = sin(\beta + \theta) \tag{6}$$

Putting (6) formula into (5) we will get

$$tg\gamma_1 = \frac{\sin\beta}{\sin(\beta+\theta)} tg\gamma \tag{7}$$

The last expression will get the following expression for the arrowhead paw upside the slope

$$tg\gamma_1 = \frac{\sin\beta}{\sin(\beta-\theta)} tg\gamma \tag{8}$$

Let us discuss the current value of ε angle according to Fig. 3

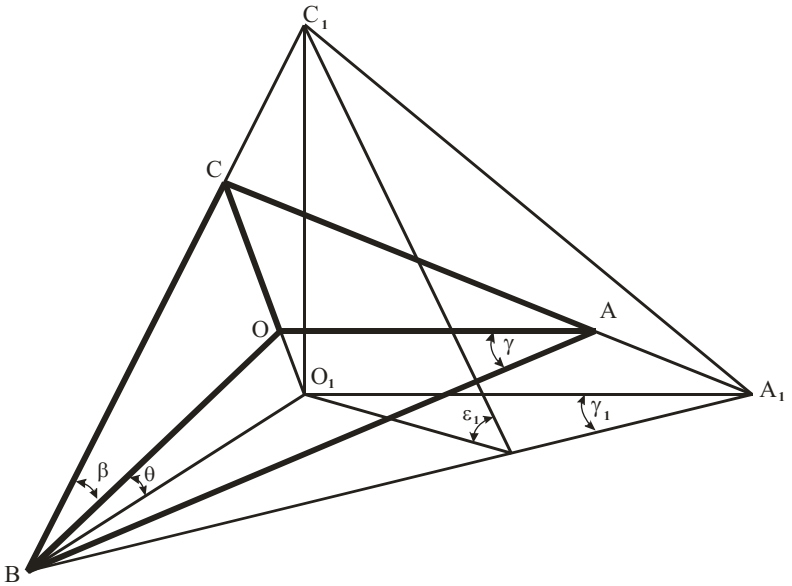

Fig. 3 The scheme of determining ε_1 angle

It is known that $tg\beta = tg\varepsilon \cdot cos\gamma$ [3]. For A_1BC_1 trihedral spike instead of β angle we will put $\beta + \theta$ angle and instead of γ angle we will put γ_1. So we can derive

$$tg(\beta + \theta) = tg\varepsilon_1 \cdot cos\gamma_1$$

$$tg\varepsilon_1 = \frac{tg(\beta+\theta)}{cos\gamma_1} \tag{9}$$

For the wing over the arrowhead paw we will have

$$tg\varepsilon_1 = \frac{tg(\beta-\theta)}{cos\gamma_1} \tag{10}$$

Let us use Fig. 1 to determine ξ angle formed by horizontal projection and direction of tillage removal according to which we can write

$$tg\eta = \frac{DK}{AK} = \frac{KE}{AK \cdot cos\varepsilon} = \frac{tg(\gamma-\xi)}{cos\varepsilon}$$

Changing the obtained expression we will get

$$tg\eta = \frac{tg\gamma - tg\xi}{(1 + tg\gamma \cdot tg\xi)cos\varepsilon}$$

Solving to $tg\xi$ we will get

$$tg\xi = \frac{tg\gamma - cos\varepsilon \cdot tg\eta}{1 + tg\gamma \cdot tg\eta \cdot cos\varepsilon} \tag{11}$$

Using formula (1), we will write the last expression in this way

$$tg\xi = \frac{tg\gamma - cos^2\varepsilon \cdot tg\gamma}{1 + tg^2\gamma \cdot cos^2\varepsilon}, \quad \text{or}$$

$$tg\xi = \frac{tg\gamma \cdot sin^2\varepsilon}{1 + tg^2\gamma \cdot cos^2\varepsilon} \tag{12}$$

Consequently

$$tg\xi_1 = \frac{tg\gamma_1 - cos\varepsilon_1 \cdot tg\eta_1}{1 + cos\varepsilon_1 \cdot tg\gamma_1 \cdot tg\eta_1} \tag{13}$$

Using 7, 8, 9 and 10 formulas and doing some mathematical changes, we will get

$$tg\xi_1 = sin(\beta + \theta) \cdot sin\beta \cdot tg\gamma, \tag{14}$$

$$sin\eta_1 = \frac{sin\beta \cdot cos(\beta+\theta) tg\gamma}{\sqrt{sin^2(\beta+\theta) + sin^2\beta tg^2\beta}} \tag{15}$$

Let us determine λ_1 unstable according to Fig. 1

$$cos\lambda_1 = \sqrt{1 - sin^2\gamma_1 \cdot sin^2\varepsilon_1} \tag{16}$$

After appropriate placements and certain transformations we will get

$$cos\lambda_1 = \frac{1}{\sqrt{sin^2\beta tg^2\gamma + 1}} \tag{17}$$

Placing 14, 15 and 17 formulas in (2) we will get the dimension of tillage movement

- up the slope

$$\Delta_1 = B\frac{tg(\beta+\theta)}{cos\theta}\sqrt{\frac{sin^2(\beta+\theta) + sin^2\beta tg^2\gamma}{sin^2\beta tg^2\gamma + 1}}, \tag{18}$$

- down the slope

$$\Delta_1 = B\frac{tg(\beta-\theta)}{cos\theta}\sqrt{\frac{sin^2(\beta-\theta) + sin^2\beta tg^2\gamma}{sin^2\beta tg^2\gamma + 1}} \tag{19}$$

Using the last formulas the graphics of changing the dimension of the tillage movement were derived depending on slope for various values of γ angle by plowshare and tillage movement ($\gamma = 30^o$ and $\gamma = 55^o$) (Fig.4).

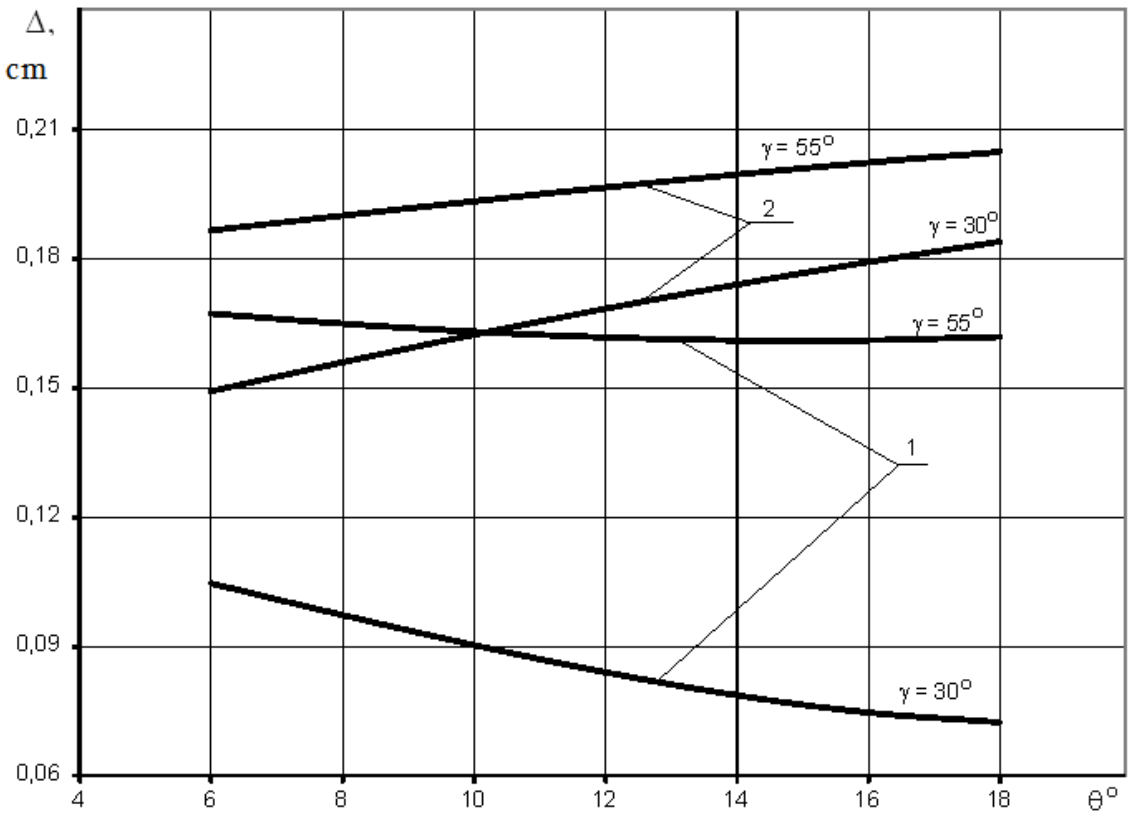

Fig. 4 Graphics of changing tillage removal on slope depending on the slope deviation
1- up to the slope, 2- down the slope

As we see from the graphics, parallel to the increase of deviation of the slope the size of tillage movement decreases. Therefore, the soil removal down the slope in case of big values of γ angle is bigger and up the slope is rather small which it is conditioned by.

Conclusion

1. The mathematical modelling of estimating the mechanical soil removal in slopes allows to determine the dimension of soil (furrow) and the change of technological parameters of working organs.
2. The obtained equations allow us to prevent the tillage movement by regulating the structural and kinematic parameters of working organs of soil cultivation.

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Լանջերում հողատարման մեխանիզմի բացահայտման և կանխարգելման համար ուսումնասիրվել է բանող օրգանի և հողի փոխազդեցության գործընթացը: Մշակվել է լանջերում հողի մեխանիկական հողատարման գնահատման մաթեմատիկական մոդել, որը հնարավորություն է տալիս որոշելու հողի (առի) տեղաշարժի մեծությունը, ինչպես լանջով ներքև, այնպես էլ վերև, կախված լանջի թեքությունից և բանող օրգանի տեխնոլոգիական պարամետրերի փոփոխությունից: Ստացվել են հավասարումներ, որոնց կիրառմամբ հնարավոր կլինի հողամշակ մեքենաների բանող օրգանների կառուցվածքային և կինեմատիկական պարամետրերի կարգավորմամբ կանխարգելել հողատարումը լանջերում:

Բանալի բառեր. լանջ, հողատարում, ակոս, սեպ, խոփ, առ, տեղաշարժ, պարամետր, հետագիծ:

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ОЦЕНКА МЕХАНИЧЕСКОЙ ЭРОЗИИ ПОЧВЫ НА СКЛОНАХ

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Для выявления и предотвращения механизма эрозии на склонах был изучен процесс взаимодействия рабочего органа и почвы. Разработана математическая модель оценки механической эрозии почвы на склонах, которая позволяет определить величину перемещения почвы (пласта земли) как по склону вниз, так и вверх, в зависимости от наклона склона и изменения технологических параметров рабочего органа. Были получены уравнения, применение которых позволит предотвратить эрозию почвы на склонах путем регулирования конструктивных и кинематических параметров рабочих органов почвообрабатывающих машин.

Ключевые слова: склон, эрозия почвы, борозда, кол, лемех, пласт земли, перемещение, параметр, траектория.

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PROBLEMS OF ASSESSING THE EFFECIENCY OF TAX PRIVILEGES IN THE REPUBLIC OF ARMENIA AND ARTSAKH

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Discussions on the methods of assessing the effectiveness of tax privileges which are the major instrument of tax policy, have recently become more frequent in domestic and foreign scientific and professional discussions. These issues have become more pressing in countries with transitional economies, including the Republic of Artsakh, where the rooting of approaches to the social, economic and budgetary benefits of tax privileges is still insufficient. These issues are more important in the context of recent tax reforms in EEU member states.

Key words: tax policy tool, tax exemption, tax expense, efficiency of tax privileges, efficiency assessment, methodology of evaluation, loss of income, tax privilege.

In all modern countries, including those internationally unrecognized, various tax policy instruments, the importance of identifying the problems of ensuring the justification of the institute of tax privileges and examining the issues of developing and applying effective mechanisms for their resolution are of particular importance.

In different periods of the development of tax system in RA various and numerous tax privileges were determined for which the superpowers, priorities and challenges became the basis which were periodically reviewed.

Their provision was implemented still in the primary stage of the formation of tax systems which are preserved up to now. The privilege of tax of revenue concerns, particularly, the sphere of agriculture, resident and non resident organizations with foreign investments.

The tax privileges which are foreseen by tax legislation in RA are mainly given to with the following purposes:

a) due to the impossibility of liquidating of lack of payment or avoiding the taxes and/or impossibility of correct registration of the base and tax object (agriculture, IT)

b) the motivation of rising the economic activity to improve the business and investment atmosphere aimed at forming more favorable tax atmosphere for business entities and rising the competitiveness of economy

c) to support certain social issues as poverty, helping the poor, health care, educational, scientific and other issues of the spheres

d) field priorities such as system forming enterprises and spheres from traditional fields to high technologies and IT having appropriate inner potential to form the description of the economy. Not denying the role and significance of tax privileges to accomplish the above mentioned task, let us mention here that they also can have negative impact and consequences which are mentioned in different scientific-professional frameworks.

The following conclusions are worth attention:

Tax privileges and freedom make the tax system worse in terms of neutrality, efficiency and simplicity[1].

As a result of handling tax privileges the reduction of tax responsibilities for certain people may be the reason for corruption[2].

[1] Toder E. Tax Cuts or Spending — Does it Make a Difference?//National Tax Journal, September, 2000, Vol. 53, No. 3, Part 1, p. 362

The study of economic literature shows that there is generally negative attitude towards tax privileges.

It is worth mentioning that by solving short term tasks the tax privileges result distortions of economic mechanisms and redistribution of resources in long term period which at last liquidates all the positive gained from the investment of the privilege making negative influence on other spheres of economy and participants.

Hence, tax privileges and freedoms make the tax system worse in terms of neutrality, justice, efficiency and simplicity[3].

There are many researches which show that tax privileges, foreseen to implement this or that purpose, don't serve these purposes in many cases or generally, but very often become means to avoid many obligatory state payments for the representatives of shady field. Hence, the decision about the accuracy of providing tax privileges should be accepted taking into account such important circumstances as direct losses of state incomes, simplicity of tax administration and legal demands, market and distributive impacts and also market imperfectness and possible impacts of external factors.

It is worth mentioning that depending on the sphere of their implementation, tax privileges can have the following impacts:

- budgetary,
- social,
- economic.

Budget influence represents itself the provision of further tax incomes to the current tax expenses.

The social outcome is manifested by rising living standards, employment and other social indicators.

In case of economic result financial resources of taxpayers are increasing which can be used to expand production and create new jobs and to increase profits.

According to above mentioned, there is a need to evaluate the effectiveness of each tax privilege which will have a major role to play in its inaction and application.

In this regard, the following methods of assessing tax privileges are used in foreign practice:

- method of missed /lost/ revenues when the tax privilege is absent, the payable sums are calculated and they are considered as paid in fact,
- method of renewed revenues in case of which the sum of additional paid taxes is determined as a result of elimination of tax privileges taking into account the change in behavior of tax payers and impacts of other taxes.
- method of equivalent costs in case of which those direct costs are calculated which the state will cover when the cost will be paid to tax payer in the form of direct subsidiary transfers paying all the taxes by the latter[4].

The first method is given the priority in the world practice as in this case the calculations are made easily.

In the second method tax privileges are assessed taking into account the change in taxpayer behavior and the impact of other taxes that require factoral analysis and the application of a wide range of data.

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[2] Cavalcanti C., Li Z., Reforming Tax Expenditure Programs in Poland, World Bank Policy Research Working Paper No. 2465, October, 2000

[3] Karapetyan H., Ways of tax regulation and their main priorities, Armenia, Finance and economics, 9-10/1993-94, January, 2016, p. 65

[4] Mayburov I., A., Ivanov Yu, B., Tax privileges, Theory and practice of their application, Unity-Dana, 2014, p. 116

The third method is the simplest but it requires taking into account all budgetary costs to achieve the goal set.

It should also be noted that, despite the simplicity of the first method, it requires some methodological knowledge for statistical reporting of tax reports.

Indeed, the provision of tax privileges and release can be justified if they

1) Clarify the market failures,
2) Are directed to the solution of the hot issues,
3) Do not create additional complications in tax legislation
4) Do not distort the behaviour of economic entities,
5) By associating the principle of «cost-revenues» they are more effective than the direct budgetary expenses[5].

At the same time, the application of tax privileges should be accompanied by appropriate justifications including the answers to the following questions:

1) Why the application of new tax privilege is principally necessary,
2) What the aims of such approaches are and how the success or failure of such event will be measured,
3) What proofs can be brought to the benefit of the thing which shows that the tax approaches will enable to reach the goals set with acceptable costs,
4) Why the tax privileges are preferable than direct budgetary costs to reach the goals set[6].

The Ministry of Finance of Armenia has been assessing the size of budget expenditures as a result of tax privileges on a macro-level and sectore basis since 2015, including only three types of taxes - VAT, income tax and profit tax, the results of which are published in annual budget procedures.

It should be noted that the practice of estimating and publishing tax expenditures has not yet been embedded in the budgetary process of the AR.

The following table can be compiled from the data provided by the Ministry of Finance of Artsakh according to our oral inquiry:

Table 1

Estimating the tax costs in RA in 2016-2018

Years	Size of tax expenses (mln AD)	Weight in tax revenues (percent)	Weight in GDP (percent)
2016թ.	12,934	39,88	5,63
2017թ.	12,773	32,10	4,69
2018թ.	13,323	24,89	4,29

Based on the data presented in the table, we can conclude that in 2016-2018 the share of tax expenditures in the Republic of Artsakh decreased by about 15 percentage while it decreased by 1,34 percentage in the period related to GDP.

More comprehensive and characteristic data on tax privileges in the Republic of Artsakh can be obtained if methodological approaches are introduced to assess the effectiveness of tax privileges in the country.

Let us note that tax expenditures have been assessed in the Republic of Armenia since 2015 but they are not implemented yet at the level of tax-exempt organizations, in particular their fiscal,

[5] Hungerford T. Tax Expenditures: Trends and Critiques. CRS Report for Congress. September 13, 2006. p. 11.

[6] Toder E., Wasow B., Ettlinger M., Bad Breaks All Around: The Report of the Century Foundation Working Group on Tax Expenditures. The Century Foundation Press, 2002, p. 28–29

economic and social impacts or effects are not assessed and «consequences of tax expenditures» are not matched for direct budget expenditure and the indirect impact of tax costs is not assessed.

Besides, the legislative bases for assessing «tax expense» are not adopted. Such a situation is also typical for many transitional and developing countries, but this cannot be an excuse for not taking adequate steps.

The assessment of «tax costs» implemented by the Ministry of Finance is not done legally and has no stated regulations and working procedures [7].

The importance of assessing the effectiveness of tax privileges and addressing the identified shortcomings and addressing these issues is also emphasized in the recently adopted document of the Government of the Republic of Armenia adopted on November 25, 2019, «Strategy for reform of the public finance management system of 2019-2023» where it is stated clearly that it is necessary to evaluate the effectiveness and targetability of the existing main tax privileges and then the tax privileges having low effectiveness and targetability should be abolished.

One more important circumstance also.

By the corresponding resolutions of the government of Russian Federation on 2019, April 12 and June 22 the methodological approaches and demands of estimation the efficiency of tax privileges were confirmed thus finishing the legislative and legal settlement of this urgent issue.

And just recently by the resolution of the government of one of the member countries of EEU Belarus on October 30 the regulation of assessment of the efficiency of tax privileges has been confirmed[8], [9].

According to the importance of those facts above mentioned and considering the fact that currently the issues of balancing tax policies and harmonization in EEU countries are being discussed, it is quite urgent and necessary both in Armenia and Artsakh to develop the system of estimating tax privileges taking into account the peculiarities of the social-economic tasks and the experience of the transit countries.

As currently the methodology of estimating tax privileges in the Republic of Artsakh is being on the agenda, the following requirements can be suggested for its development

1. **Methodical criteria**
   - Tax privilege, identification of criteria of expected results in the end of its application and provision,
   - Determination of sources of analyses of tax privileges,
   - Development of monitoring and estimation of tax privileges.
2. **Mathematical (calculating) criteria**
   - Identification of time log of manifesting the result after inserting corresponding privilege
   - A combination of tax expenditures and related outputs at high prices
   - Economietric analyses of multi vectoral impact of tax privilege
3. **Organizational criteria**
   - Formation of organizational events
   - Creation of specialized structures estimating the efficiency of tax privileges
4. **Criteria of experimental assessment**
   - Legislative approval of tax privileges in the tax legislation, preliminary discussion of the expert group with the specialists of relevant state bodies
   - Involvment of experts for analyzing the effectiveness of tax privileges
   - Survey of organizations, enterprises and business entities for the application of tax privileges and demand.

[7] Ara Qaryan, The issues of assessment of the effectiveness of the state budgetary incomes and tax costs, what to do? 2nd economic revolution, perception and implementation, scientific–practical summit

[8] Ministry of Finance of Russian Federation, the direction of budgetary, tax and custom-tariff policy on 2020 and plan period of 2021 and 2022. The document is presented in www.consultant.ru. 25.11.2019, p. 45

[9] http://www.pravo.by/novosti/novosti-pravo-by/2019/november/41911/

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9. http://www.pravo.by/novosti/novosti-pravo-by/2019/november/41911/

ՈՒԴԴ - 332.13:334.76

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Կ.Ա.Ներսիսյան
Շուշիի տեխնոլոգիական համալսարան

Վերջին տարիներին հայրենական և արտասահմանյան գիտական և մասնագիտական քննարկումներում ավելի հաճախակի են դարձել հարկային քաղաքականության կարևորագույն գործիք հանդիսացող հարկային արտոնությունների կիրառման արդյունավետության գնահատման մեթոդների հիմնախնդիրների քննարկումները:

Նշված հարցերը առավել արդիական են դարձել անցումային տնտեսությամբ երկրներում, այդ թվում՝ նաև Արցախի Հանրապետությունում, որտեղ դեռևս բավարար չափով չեն կարևորվում տրամադրված և տրամադրվող հարկային արտոնությունների սոցիալ-տնտեսական հետևանքների և բյուջետային եկամուտների վրա հարկային արտոնությունների չափելիության մոտեցումների արմատավորման հարցերը:

Նշված հիմնահարցերը ավելի են կարևորվում ԵԱՏՄ անդամ երկրներում վերջին տարիներին իրականացվող հարկային բարեփոխումների համատեքստում:

Բանալի բառեր. հարկային քաղաքականության գործիք, հարկային արտոնություն, հարկային ծախսեր, հարկային արտոնությունների արդյունավետություն, արտոնության գնահատման մեթոդիկա, եկամուտների կորուստ, ԵԱՏՄ, ներդաշնակեցում, հարմոնացում:

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ПРОБЛЕМЫ ОЦЕНКИ ЭФФЕКТИВНОСТИ НАЛОГОВЫХ ЛЬГОТ В РЕСПУБЛИКЕ АРМЕНИЯ И РЕСПУБЛИКЕ АРЦАХ

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В последние годы дискуссии о методах оценки эффективности налоговых льгот, которые являются основным инструментом налоговой политики, стали более частыми в отечественных и зарубежных научных и профессиональных дискуссиях. Эти вопросы становятся все более актуальными в странах с переходной экономикой, включая Республику Арцах, в которых недостаточное внимание уделяется оценке социальных, экономических последствий представленных налоговых льгот и укоренению подходов изменяемости воздействия налоговых льгот на бюджетные доходы.

Эти вопросы обретают еще большую важность в контексте недавних налоговых реформ в государствах-членах ЕАЭС.

Ключевые слова: инструмент налоговой политики, освобождение от налогов, налоговые расходы, эффективность налоговых льгот, оценка эффективности, методология оценки, потерии доходов, ЕАЭС, синхронизация и гармонизация.

Ներկայացվել է՝ 02.12.2019թ.
Գրախոսման է ուղարկվել՝ 03.12.2019թ.
Երաշխավորվել է տպագրության՝ 18.12.2019թ.

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A NUMBER OF ANTI CORRUPTION ACTIVITIES IN ARMENIA

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Corruption is considered one of the key issues in the modern world nowadays which the importance of fighting against is conditioned by. Developments of corruption in Armenia are also very worrying. Despite the fact that the corruption in Armenia has relatively good rating compared to regional countries, it is still quite below the average global rate of corruption. This means that a benchmark above the average global rate of corruption should be set as the target of the fight against corruption and one of the main objectives of the fight against corruption should be regarded the gap between the indicators of factual and targeted corruption. The article outlines the main directions and principles of the fight against corruption in Armenia.

Key words: corruption, anticorruption programs, shade economy, tax potential, shade indicator, economic corruption, fight against corruption, rating position of corruption, world average evaluation of corruption, index of comprehending the corruption.

Introduction

The fight against corruption is recognized as one of the main directions of the strategy of national security in Armenia.

The corruption, penetrating to all spheres of social and economic relations, has become a quite complicated and multi-layered phenomenon. From this viewpoint corruption may be characterized as «deterioration and deformation of the system in vitally important spheres» of social, political, social-economic, cultural and psycholo1gical and moral multilateral relations [1: 196-197]. In the context of such perceptions of corruption, the role of economic corruption is crucial in its multifaceted manifestations. Its essential feature is that by directly participating in illegal redistribution of public income created by economic entities, it damages both the economy and public life thus becoming a serious threat to national and international security.

Set of conflict and research results

The main task of anti-corruption activities in Armenia is to effectively prevent corruption and to apply public support measures to reduce corruption levels in both public administration and a number of spheres and sectors of the economy. Improvement of the RA legislation which regulates the policy of development of the sectors and spheres involved in the fight against corruption corresponds to international standards and one of the most important directions of prevention of corruption are also the effectiveness, transparency, publicity and accountability of the activities of state bodies. It will be facilitated by the clarification, improvement of the functions of state bodies, the definition of professional standards of employees. Criminalization is one of the directions of no less importance.

Corruption is regarded as one of the key issues in the modern world nowadays due to which the attention of the world community is focused on fighting against it and preventing it. The problem has become even more topical and urgent today amidst the conditions of widespread development of corruption.

According to estimatations of various international sources[10] , developed countries with a high standard of living are at the forefront with low level of corruption which fight continuously against

[10] Source *Transparency International. Corruption Perceptions Index 2018*
https://www.transparency.org/whatwedo/publication/corruption_perceptions_index_2018

corruption. And, on the contrary, developing countries with particularly ineffective governance system and low level of socio-economic development such as Azerbaijan, Russia, Ukraine, Kazakhstan, Iran etc. are especially noted as highly corrupted in rating list.

Armenia is now in rather favorable situation in terms of corruption rate compared to other countries of the region occupying the 105th place (Fig. 1).

Fig. 1 Position of RA according to the index of corruption rate [2]

According to the data by Transparency International organization, the corruption rate which had been fluctuating during the last 11 years in Armenia, has not shown stable behavioral tendencies. Such a picture we have according to the estimation of corruption level by Freedom House (Fig. 2).

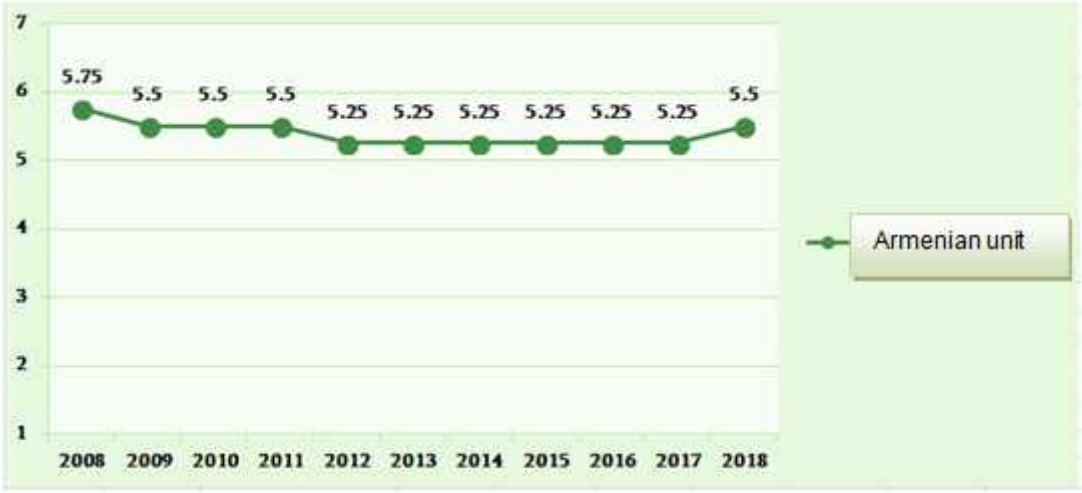

Fig. 2 Corruption level in RA according to Freedom House [3]

According to the chart, the level of corruption in Armenia had declined by only 0,25 points over the last ten years which is a very small indicator and is largely due to not the anti-corruption policy adopted by the state but to the increasing corruption concealed by modern technological opportunities.

The indices of corruption of Armenia which have shown some fluctuations in recent years have not been changed significantly. This is due not only to the inefficiency of anti-corruption programs in the country but also to the progressive corruption rates in other countries which condition the relatively stable unfavorable position of Armenia in the ranking. This is also evidenced by the fact that the assessment of corruption in Armenia is still below the world average (Fig. 3).

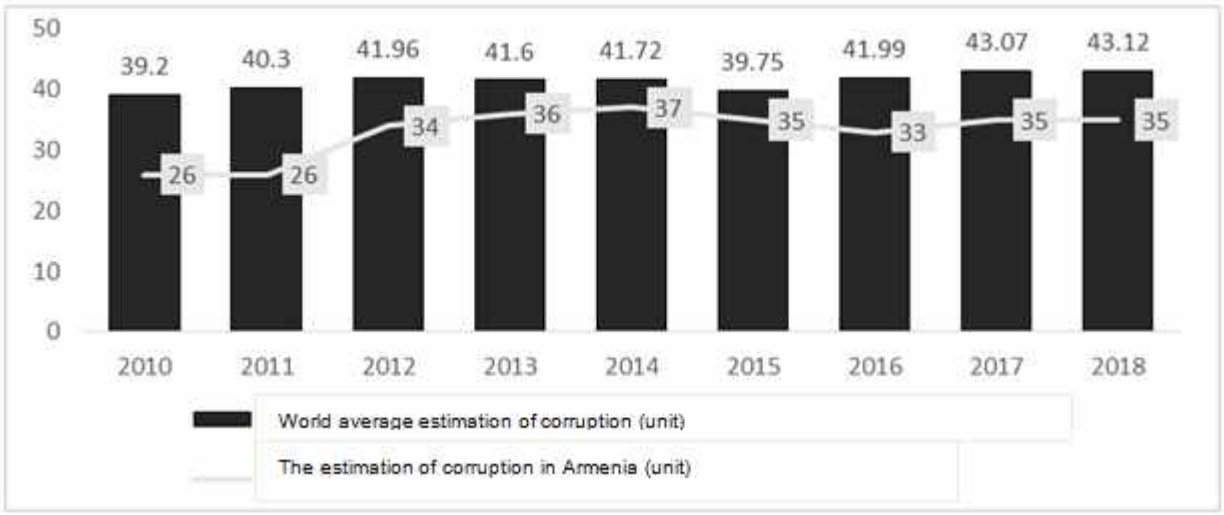

Fig. 3 The estimation of corruption of RA and World average [4]

So we can conclude that the realistic and basic criterion of aimed fight against corruption in Armenia should be adopted the one which is higher than world average and filling the gap between the factual and purposeful indices of corruption should be regarded as one of the main issues of fighting against corruption.

The interrelated and interconnected wide scale evaluations of corruption and <<shade>> have deep negative impact on the social–economic developments of the country [5:164-182].

- shade economy forms corruptive relations in those spheres of politics and economics which the welfare is dependent on,
- shade economy is developing in the conditions of severe corruption of state government,
- corruption effects the continuity of shade economy and development of illegal activity,
- corruption creates bases for the formation of new spheres and new types of shade economy.

Despite the contextual features and functional differences of corruption and the shade economy, there is a close interdependence and interconnection between them, whereby the shade economy generates corruption and the corruption, in its turn, promotes shade activity, creates serious misbalance and distortions in macro and micro economics.

Practical observations [5] in corruption and <<shade>> also state the direct relation of corruption level and the scales of shade economy/the higher is corruption the larger are <<shade>> developments and vice versa/ and their impact on social-economic situation of the country. Particularly, mainly the same countries appear in high, low and middle groups with targeted rating groups of corruption and shade economy with certain exceptions. Taking into account the given patterns of interaction between corruption and the shade economy and regarding corruption and the shade economy as the key component of "anti-economy", it is important to fight against corruption through a coherent and systematic approach by ceasing corruption and reducing the shade economy and by regular implementation of proper activities. This should be one of the important approaches to the fight against corruption.

In the modern world, corruption is one of the most important issues in the creation of a competitive economy and the formation of civilized entrepreneurship. According to Transparency International [4], about 40% of entrepreneurs around the world have to corrupt to provide "favorable"

The world average rate of corruption is calculated by the average indices of the countries included in the research. The data of corruption have been calculated by multiplying them by 10 since 2012 conditioned by the change of estimation methodology for the security of their compatibility. The RA average corruption rate was calculated by their arithmetical average.

conditions for their business and to avoid tax payments. In developed countries this rate is 15%, in Asian countries - 30% and in CIC countries - 60%. Armenia is not an exception either. The problem has become more evident on the one hand in case of slow economic growth and reducing tax revenues and on the other hand in the continuing tendency of the business world striving for "shade". In this context the issues of reducing the formal economy, reducing tax evasion and thus bringing the collected taxes to the maximum tax potential are of utmost importance [6:178-197]. Here the remarkable statement of RA Minister of Finance Atom Janjughazyan is notable: "We have to bring our tax revenues to our tax potential or we have to agree that we have no shade and no problem. According to our estimation the taxes collected for 2018 are less for about 438 billion drams without the share of privileges» [7].

The tax potential is the sum of the taxes actually collected and the tax breaks (unpaid taxes) stated by the administration and legislation. Tax administration may not be perfect not only in Armenia but in other countries as well, as it would be possible in case of perfect tax legislation which is also not realistic. In such conditions, part of the tax revenue circulating in the economy is concealed by legislative and administrative gaps without replenishing the state budget. Thus, the tax legislative and administrative gaps are the uncollected revenues of the state or so called unpaid taxes. Thus, the issue of reducing administrative and legislative gaps in the country, unpaid taxes /tax shadowing/, maximizing the collection of taxes and bringing it closer to tax potential is an important priority in the fight against corruption.

Here we should understand how many the administrative and legislative gaps are and what the acceptable start is, how much the unpaid taxes and tax shade are, how the tax potential is according to the legislation and what the permitted start of inclination from the maximum rate of tax collection form tax potential etc.

Unfortunately, we should say that all these question are missed in official statistical publications. In this regard the actual rate of 438 billion AMD which was officially announced on unpaid taxes in Armenia in 2018, allows us to suppose that it is possible to calculate. Moreover, by middle term cost program of RA the targeting is improving year by year for 0,2 percent of GDP to the tax administration [7]. Such calculations are done in fact but they are not published. Even such key indices as shade volume, shade weight in GDP etc. are not available. Despite the opinion that it is difficult to give the proper estimation to the shade, however, it is implemented in international practice. Often it is estimated by the index of unpaid taxes to current GDP. It enables to estimate the concealed real revenue and product life cycle and get the real picture of the economy. On the contrary we will have the distorted picture of the economy: the real size of GDP is distorted because the uncounted portion of goods and services for satisfaction of public needs is not accounted while determining GDP.

The inclusion of the shade indicator in GDP will limit the possibility of various speculations of the GDP indicator on the growth of the economy, increase of tax rates, reduction of shade etc. which in its turn will allow to calculate the state tax burden, to assess the possible tax revenues and/or tax lost revenues. Such approach will promote the abolition of monopolies in Armenia and the formation of an open competitive economy [8:86]. If the shade/GDP ratio is clearly calculated and formally adopted, then "… it will mean that the economic policy of Armenia should be revised and the tax field should be changed" [9], where the shade/GDP ratio along with the tax/GDP ratio should be key index and should be viewed as a target indicator of the fight against shade. The indices of tax potential, collected revenues and unpaid taxes are also important here. It means that all of these criteria must be formally adopted, calculated, published and circulated. This approach should be a key component of the fight against corruption and shade.

One more important point is noted in the fight against corruption: as we see in Table 1, the estimations of various international sources on corruption are quite different. It can be supposed that this is due both to the methods used in evaluating corruption and to the factors and criteria selected for evaluation. This obviously complicates the objective and complex identification of the developments of corruption, their manifestations and existing problems. This is particularly relevant to Armenia as

regulated assessments and analyzes of corruption and shade are not formally carried out yet. And their assessments by researchers and stakeholders are mostly sectoral with serious deviations from current regulations and/or sometimes contradict them. For example, in the analysis of corruption and shade economy in Armenia there is an inverse dependence in certain cases: in case of the growth of the shade economy there is a decline in corruption and vice versa [5: 178]. Taking into account that the possibility of such developments practically tends to be zero, we may only suppose that the results of such analysis may be due to either the lack of information or methodological misunderstandings.

So we can conclude that the task of clarifying the methodology of calculation of "shade" and corruption and the balance between them is very severe today in terms of regarding the totally objective estimation of corruption and "shade" and their impact on the social-economic situation of the country and, consequently, as a guarantee of proper diagnosis and correct solutions of the situation.

Such an approach will enable to totally estimate the economic situation and make the policy of the country more targeted, and, at last, to terminate the doubts towards the estimation of the index and/or limit the chance of their manipulations.

In addition it should be noted that the experience of different countries has shown that the best result in the process of assessing and calculating tax potential and shade can only be achieved through joining the efforts by state legal authorities and through mutual understanding and effective cooperation of state and society as an effective means of fight against corruption.

According to the Survey on Corruption among those with higher education in the Republic of Armenia [], 60,9 % of respondents consider corruption to be very topical in Armenia and 23,9% consider it to be topical thus considering that there are more important issues, 2,2% do not consider it topical at all and 13% find it difficult to answer the question. 39,1% of respondents definitely criticize those corrupted, 28,2% criticize more than agree with, 17,4% are more indifferent than to criticize and 15,2% does not criticize such people at all. 37% of the respondents clearly criticize the people who initiate corruption and do it and 10,9% do not criticize such people at all. 69,6% of the respondents consider the level of corruption in Armenia high and 19,6% - very high. 54,3% of the respondents believe that the level of corruption will decrease in the near future, 17,4% - it will decrease significantly, 21,7% think it will not change and 6,5% find it difficult to answer this question. The results of the survey create a rather contradictory picture. On the one hand, the level of corruption in Armenia is considered high, but there is no general intolerance regarding the practice of corruption and on the other hand, they believe that the level of corruption will decrease in the near future. This means that there is still no clear attitude towards corruption in our country which implies consistent work by the state and public level to realize the danger of corruption and to create an atmosphere of public intolerance in the country as a key component of the fight against corruption.

Conclusion

Summarizing, we can say that corruption and the shade economy in Armenia have systemic character with serious structural problems which means that the fight against corruption and shade economy must be systemic as a priority for structural reforms. The experience of foreign countries shows that in order to rise the level of effectiveness of the fight against corruption the policies adopted by these countries are developing in one direction with the establishment of an independent anti-corruption institutional body that will regulate the implementation of all measures aimed at reducing corruption.

We suggest creating an anti-corruption strategic plan among the fighting activities noted in Armenia which will have

- organizing and implementation of activities of certain events,
- monitoring and evaluation of the project,

[] The survey was done by their own initiative. The targeted group were people with higher education. Questionnaire was formed by the authors of the following book –Levakin I. V., Okhotskiy E. V., Okhotskiy I. E., Shediy M. V., «Anti corruption activities», manual and practice for baccalaureate and specialists /under editing of E. V. Okhotskiy, 3rd edition, M., publishing house Yourite, 2018.

- summarizing the reports on the progress of the implementation of the project etc.

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ՈՒԴԴ – 330.3:346.7.9

ՀԱՅԱՍՏԱՆՈՒՄ ԿՈՌՈՒՊՑԻՈՆ ԴՐՍԵՎՈՐՈՒՄՆԵՐԻ ԴԵՄ ՊԱՅՔԱՐԻ ՄԻ ՇԱՐՔ ՄԻՋՈՑԱՌՈՒՄՆԵՐԻ ՄԱՍԻՆ

Ա.Ս. Սարիբեկյան
Երևանի պետական համալսարան

Կոռուպցիան այսօր համարվում է ժամանակակից աշխարհի առանցքային հիմնախնդիրներից մեկը, ինչով էլ պայմանավորված է դրա դեմ պայքարի կարևորությունը: Հայաստանում նույնպես կոռուպցիոն զարգացումները բավական մտահոգիչ են: Չնայած տարածաշրջանային երկրների համեմատ Հայաստանի կոռուպցիայի հարաբերական լավ վարկանշային դիրքին, այնուամենայնիվ, կոռուպցիայի համաշխարհային միջին գնահատականից

այն դեռևս բավական ցածր է: Սա նշանակում է, որ Հայաստանում՝ որպես կոռուպցիայի դեմ պայքարի նպատակային չափորոշիչ պետք է սահմանել կոռուպցիայի համաշխարհային միջին գնահատականից բարձր շեմային ցուցանիշ, և կոռուպցիայի դեմ պայքարի հիմնական խնդիրներից մեկը դիտարկել կոռուպցիայի փաստացի ու նպատակային ցուցանիշների միջև առկա ճեղքի հաղթահարումը: Հոդվածում ներկայացվել են Հայաստանում կոռուպցիայի դեմ պայքարի հիմնական ուղղությունները և սկզբունքային մոտեցումները:

Բանալի բառեր. կոռուպցիա, հակակոռուպցիոն ծրագրեր, ստվերային տնտեսություն, հարկային պոտենցիալ, ստվերի ցուցանիշ, տնտեսական կոռուպցիա, պայքար կոռուպցիայի դեմ, կոռուպցիայի վարկանշային դիրք, կոռուպցիայի համաշխարհային միջին գնահատական, կոռուպցիայի ընկալման ինդեքս:

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ОСНОВНЫЕ НАПРАВЛЕНИЯ И ПОДХОДЫ БОРЬБЫ ПРОТИВ КОРРУПЦИИ В РА

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Коррупция сегодня считается одной из ключевых проблем в современном мире, чем и обусловлена важность борьбы против нее. В Армении также борьба против коррупции стала актуальной. Несмотря на относительно хорошую рейтинговую позицию коррупции Армении по сравнению с территориальными странами, она намного ниже средней всемирной оценки коррупции. Это означает, что в Армении в качестве целевой критерии борьбы против коррупции нужно устанавливать показатель выше средней всемирной оценки, и одной из основных проблем борьбы против коррупции рассматривать преодоление существующего разрыва между фактической и целевой показателями коррупции. В статье также представлены основные направления и принципиальные подходы борьбы против коррупции в Армении.

Ключевые слова: коррупция, теневая экономика, борьба против коррупции, рейтинговая позиция коррупции, средняя всемирная оценка коррупции, индекс восприятия коррупции.

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ABOUT THE ROLE OF ENVIRONMENTAL PROTECTION IN ECONOMIC DEVELOPMENT

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The article highlights and discusses environmental issues from the point of view of economic development. Emphasis is placed on the need to develop an environmental orientation and an environmental-based structural policy for economic development, as well as to ensure environmental balance, which is reviewed as an important precondition for minimizing the factors limiting the country's economic growth and enhancing the role of environmental protection in sustainable economic development. There is a need to increase the role of environmental protection in the development of the economy by outlining appropriate targeted steps and measures.

Key words: Economic growth, economic development, natural resource, material resource, environmental balance, balanced use of nature, environmental orientation and environmental policy, sustainable development, environmental policy.

Currently, the protection of the natural environment has become, among other sciences, also an issue of the economic study. Continuous growth and development of the public production brings forth the negative environmental alterations. The human society has entered into the age of economic and ecologic alterations peculiar by the increase of the global environmental challenges, enlargement of the exploitation of natural resources, reduction of the recovery capability of the environment, and increase of unfavorable effect of human activity on it. There forms a situation when the society is not able to eliminate its own negative natural after-effects that have a growing significance in respect of the recreation and people's growing demands.

Any economic development is based on the three factors of the economic growth: the capital, the work power and the material resources.

Currently the unrecoverable natural resources are consumed because of their unlimited use by the mankind, and the consumption of the recoverable resources overgrows rapidly, exceeding their capabilities of reproduction and recovery. Thus, on the current stage of society development, the material resources become the limiting factor among the three factors of economic growth[11].

Today a significant attention is given to the issue of the innovatory economic development, within the framework of which we study the role of human capital in the innovatory economic development[12] and the ecological business as a prospective factor of the innovatory economic development and imperative need for time[13]. According to the recent point of view, the use of the ecological innovations and the means of production organization ensuring the environment protection allow maintenance of the best possible balance in the regional economic development and the environment protection. Persons studying this issue (K. A. Kuznetsova, D. A. Detkina) present the conception of the social and ecological responsibility of enterprises in the modern world, with the following main point: each company that strives for success not only must have an active social

[11] Kotenko A. L., Theoretical basis of resource saving as the key factor of economic development, Bulletin of Astrakhan State Technical University, № 4, Publisher: Astrakhan State Technical University, Astrakhan, 2007, p. 19-22.

[12] Gadieva M. B., The role of human capital in the innovational development of Russia's economy: The challenge of time времени, Bulletin of the Moscow University. Issue 6: Economy. Publisher: Moscow State University named after M. V. Lomonosov" Publishing House (press), № 6, Moscow, 2009, p. 3-14.

[13] Kuznetsova K. A., Detkina D. A., Environmental business as the prospective element of the innovational development of the region's economic, Economic of knowledge: The innovative ecosystem and the new industrialization of the region, Scientific editor V. V. Yermolenko. Publisher: Kuban State University, Krasnodar, 2017, p. 114-112.

responsible position, but also must follow and be in compliance with the legislation of the environment protection and take care of the improvement of the ecological situation[14].

Currently an urgent issue is also the development of such strategy that is based on the economic development of the society in an ecologically acceptable way. Actually, the necessity of maintenance of environmental balance and addressing the economic problems of the sustainable development conception is emphasized. Regarding the principal issues of economic development, it is defined as a development when the means of production and the level of their use do not endanger the mankind and the nature, both in present and in future. The principles of the sustainable development are stated in the Rio Declaration (1992).

The introduction of resource-saving technologies and increase of efficiency of resource consumption by minimizing the waste and recycling has been considered as a temporary solution for the issue of ensuring the ecologically acceptable economic development. The main steps of this course have been revealed on the UN World Summit on Sustainable Development (RIO + 10, August, 26 – September 4, 2002). The leaders of 179 countries worldwide accept the unprecedented global program-plan for the XXI century's activities within the scope of the sustainable development, and the common strategy for the environmental, economic and social issues. According to this agenda, the issues of the fight against poverty, protection of the atmosphere, water resources and biodiversity, support of agricultural sustainability and a number of other issues of sustainable development.

These issues include prevention and minimizing of waste, recycling of resources, as well as use of alternative ecological net materials. Implementation of these steps includes participation of the governments and all the interested parties, in order to minimize the negative effects on the environment and to increase the efficiency of resources.

Taking into consideration the abovementioned facts, within the frameworks of this study, we have tried to review the role of the environment protection for the economic development and to indicate the courses for improvement of the rational use of natural resources, particularly emphasizing the need for development of a structural policy ensuring environmental oriented and environment-based economic development and ensuring the environmental balance.

From the point of view of the economic development the urgency of the research regarding the main issues of the environment protection is conditional on the severity of these problems, as far as the traditional approach in development of economy and society creates a number of global issues in respect of the nature and environment, including ecological issues. It is typical that all these main issues are interlaced with the issues related to the other elements of the sustainable development and require complex and combined management, review of the strategic programs and improvement of the policy. Besides, from the point of view of the sustainability of economic development, the definition of the role of environment, distinction of the priorities and regulation thereof, within the scope of the economic and environmental changes, is the issue of a great urgency in which not only the main governmental bodies and the local self-governed bodies of the republic are interested, but also the public organizations having activities in this field.

In the sphere of environment protection the policy of the given country depends on the level of its social and economic development, however the environmental policy must anyway provide solutions for a number of complex issues that are common for all countries, regardless their political structure. These issues are related to the pollution of the natural environment (water, atmosphere, soil, etc.). The data obtained are processed, and that allows estimation of the type and level of pollution of the territory or region during the use of nature and production, and defines criteria of those priorities that will make possible to maintain the environment in its natural condition, to develop environment protection programs and to recover and improve the environment.

The environment protection programs are drafted similar to the development and consumption programs. Their development must take into consideration the predictable reasonable costs that shall be linked to the annual, complex and prospective budgets of the local, regional and national level.

The higher is the national income, the bigger is the sum that can be provided for the environment protection measures.

The implementation of environment protection programs is connected with the proirity issue of how much financial resources the government possesses for this purpose, what are its capabilities in

[14] Kuznetsova K. A., Detkina D. A., Environmental business as the prospective element of the innovational development of the region's economic, Economic of knowledge: The innovative ecosystem and the new industrialization of the region, Scientific editor V. V. Yermolenko. Publusher: Kuban State University, Krasnodar, 2017, p. 104.

development of effective and financially beneficial laws and normative acts in environmental policy. The latter includes multiple regulative and economic methods connected to the reconstruction of economy that can be highly beneficial. For example, in the last decade the government significantly reduced financial support to the industry and agriculture that resulted in energy saving and, as a result of this, reducing the air emission of hazardous substances affecting the health of people.

Gradually, with the purpose of energy saving, it becomes necessary to introduce advanced technologies. The profitability of investments and risk assessment and, as a result of it, ensuring and safeguarding the environmental situation in the country become priority issues. Implementation of these measures is rather connected with lack of the financial resources and absence of organizational arrangements than with the peculiarities of the certain environmental problems or seeking opportunities for their solution.

The transition of the Republic of Armenia from the centrally-planned to market economy is to improve not only the economic condition of the country, but also to benefit the sustainability of ecological conditions of its natural environment in short, medium and long term. The important fact to be considered that the market economy includes such a system of laws, financial investments, taxes, fines and penalties that may prevent or minimize the misuse and illicit exploitation of natural resources and preserve the natural environment from the human and technical pollution creating healthy living conditions for people. Solution for these priorities is necessary not only for the current population but also for the future generations who are under the real threat of environmental crisis[15].

To achieve the proposed aim it is necessary to implement an environment-based structural policy as an important prerequisite for minimization of the factors restraining the economic growth of the country and increase of the role of environment protection in the issue of economic development. This will include such an implementation system, which will ensure development of the industry in the field of high-tech and science and technology that will be given the priority for introduction of resource and energy saving technologies in the industry ensuring purity and safety of products and production.

Developing the model of expenses provided for the level of the environment protection measures, it is necessary to take into consideration the following social and economic and natural criteria:

-minimal proved level of the basic environmental and economic funds,

-reducing of costs for maintenance of reproduction and growth rates of the products of plant cultivation, cattle-breeding and livestock farming,

-productivity improvement due to enhancement of the workers' health, minimizing the days missed due to occupational disease,

-improvement of the profitability rate of the secondary production owing to production residues,

-development of the price system in the field of the use of nature,

-improvement of the level of provision for the funds and energy for the environment protection measures, and organization of cooperation of the environment protection measures of the regional enterprises,

-Volume of industrial waste clean-up,

-cost price of cleaned-up water in the water supply circulation,

-specific rate of oxygen reproduction in the forested areas of the region,

-the level of effect of the other regions on the condition of the natural environment of the given region, etc.[16]

Accounting of the listed criteria gives an opportunity to create a model of environmental and economic system in the form of linear interlinks of nature-using economy that allows revelation of changes of environmental and economic system.

Currently the possible full and effective use of the industrial, agricultural and domestic waste is an important resource for the production. This implies the creation of the organizational and economic methods and technological procedures that ensure the best possible and full use of these materials. Recently in the mining, as well as in the processing industry a large amount of waste and residues is

[15] Babayan E. A., Economic priorities of the use of nature and environment protection in the RA, Yerevan, 2006, p. 7-9.

[16] Babayan E. A., Economic priorities of the use of nature and environment protection in the RA, p. 13.

accumulated and keeps accumulating, and this amount is growing concurrently with the growth of the industry.

It is very important that the issues of the use of secondary raw materials have the most significant part in the long-term programs.

Nowadays the business life and the necessity of economic analysis emanating from this are increasing. Currently the great importance is given to the main issue of the quality of so called "unrecoverable" natural values, including the atmosphere, rivers, lakes and coastal waters, landscapes and terrain of the seas, flora, etc., the natural characteristics of which "designate" the most significant material limitations. These must be implemented by means of certain economic forms, ensuring a common whole demand for the appropriate natural values. "The natural environment characteristics such as the integrity of the single parts of its elements, their links with the biosphere and their unity are significantly different from their ordinary commodity values, addressing the people's requirements in response to their effective demand. The demand for the environmental values cannot be a personal consumption demand. Based on the public characteristics of the natural values, a single combined demand is necessary in respect of them"[17].

Certainly, the study of the economic procedures emanating directly from the scope of the production (and for this reason it is not always presented in the documents, and often is of a subtle nature) is not an end in itself and is not aimed on the solution of the recognition issues only. In respect of the real economic relations any objective information, as well as the investigation results of other procedures, finally must be also formed like the practical measures regulating the activities of managing subjects.

Thus, development of the economy of the RA significantly depends on the effective use of resources, based on the modern mechanisms of management of environment protection and use of the nature. Based on the requirements in respect of the environment protection, with the purpose of its effective management, it is necessary to reveal its main criteria, the environmental oriented structural policy, and also the natural materials, powers and factors that affect the human life and lifestyle and are called the natural resources, and the role of their protection in the development of economy is significant. Therefore it is necessary to designate and develop a conception of enhancement to the highest possible level of the role of environment protection in the issue of development of economy by indicating the appropriate steps and measures.

From the point of view of the environmental priorities of sustainable economic development, the following must be outlined:

-in the terms of sustainable use of resources: the need for introduction of the modern methods of assessment of the nature's reproductive capabilities, in order to ensure interacting balanced condition between the rate of economic development and the ecological and environmental regulations in our country.

-in the basis of the RA CB state strategy a priority must be given to the strengthening of the environmental element of economy which is necessary to combine with harmonization of the public environmental and economic interests.

-Basing on the capacities of the natural resources in our country, the number of the organizations using these resources in the national economic structures, and the current condition of the recoverable and unrecoverable natural resources, we propose to use as a guide the example of the "Balanced use of nature" within the scope of sustainable development of the economy as the primary element of the effective environment management system.

-Within the scope of the sustainable development the policy and strategy of our country must have tendency to promote the improvement of economy and natural environment protection, as well as to the creation of mutually regulating links between ecological approaches and measures aimed on the recovery and maintenance of the environment in the condition close to the natural, the correct and permanent management of which will make possible to ensure the harmonized social, economic and environmental development in our country.

[17] Bartov V. F., Sedov V. V., The conception of interaction of the economy and the nature, Moscow, "Mysl", 1984, p. 159.

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ՏՆՏԵՍՈՒԹՅԱՆ ԶԱՐԳԱՑՄԱՆ ԳՈՐԾՈՒՄ ՇՐՋԱԿԱ ՄԻՋԱՎԱՅՐԻ ՊԱՀՊԱՆՈՒԹՅԱՆ ԴԵՐԻ ՄԱՍԻՆ

Դ.Կ. Պողոսյան
Շուշիի տեխնոլոգիական համալսարան

Հոդվածում կարևորվում է շրջակա միջավայրի պահպանության հիմնահարցերը՝ տնտեսության զարգացման տեսանկյունից: Շեշտադրվում է տնտեսական զարգացման բնապահպանակողմնորոշիչ և բնապահպանահենք կառուցվածքային քաղաքականություն մշակելու, ինչպես նաև բնապահպանական հավասարակշռություն ապահովելու անհրաժեշտությունը, որը դիտարկվում է որպես երկրի տնտեսական աճը սահմանափակող գործոնները նվազագույնի հասցնելու և տնտեսական կայուն զարգացման գործում շրջակա միջավայրի պահպանության դերը բարձրացնելու կարևոր նախապայման: Առաջադրվում է տնտեսության զարգացման գործում շրջակա միջավայրի պահպանության դերի բարձրացման անհրաժեշտությունը՝ համապատասխան նպատակային քայլերի և միջոցառումների նախանշմամբ:

Բանալի բառեր. Տնտեսական աճ, տնտեսական զարգացում, բնական ռեսուրս, նյութական ռեսուրս, բնապահպանական հավասարակշռություն, հաշվեկշռված բնօգտագործում, բնապահպանակողմնորոշիչ և բնապահպանահենք կառուցվածքային քաղաքականություն, կայուն զարգացում, բնապահպանական քաղաքականություն:

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О РОЛИ ОХРАНЫ ОКРУЖАЮЩЕЙ СРЕДЫ В ЭКОНОМИЧЕСКОМ РАЗВИТИИ

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В статье обсуждаются экологические проблемы с точки зрения экономического развития. Подчёркиваются необходимости разработки экологической направленности и экономической политики для экономического развития, а также обеспечения экологического баланса, что рассматривается в качестве важной предпосылки минимизации факторов, ограничивающих экономический рост страны, и повышения роли защиты окружающей среды в устойчивом экономическом развитии. Необходимо повысить роль охраны окружающей среды в развитии экономики путем определения соответствующих целевых шагов и мер.

Ключевые слова: Экономический рост, экономическое развитие, природный ресурс, материальный ресурс, экологический баланс, сбалансированное использование природы, экологическая направленность и экологическая политика, устойчивое развитие, экологическая политика.

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THE VISION OF ECONOMIC COOPERATION BETWEEN SOUTHERN CAUCASUS, ARMENIA AND ARTSAKH

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Currently, the economic area of the Earth is shared between different economic and political associations. The struggle for each square meter of area has been so sharpened that we can surely insist that each square meter is "occupied" or used by these associations. Moreover, superpowers have been struggling even for the poles of the earth. For example, the economic potential of the North Pole is estimated more than $ 30 trillion. In the coming years the process of fusion of economic associations will proceed at a new pace. The South Caucasus region is also undergoing a process of economic integration and deepening of scientific and technical progress which in this or that way relates both to the regional 3 countries (Armenia, Georgia, Azerbaijan) and to the economic relations and interrelations between them. Increasing the efficiency of economic relations and applying the theory of comparative advantage in the base is of vital importance for ensuring higher rates of economic growth and significantly increasing the standard of living of the population especially for the Republic of Armenia and the Republic of Artsakh. In such conditions it is also important to develop and implement new directions of economic partnership which will open new horizons for the socio-economic development of Armenia and Artsakh.

Key words: gross domestic product, external product life cycle, export, import, coefficient of comparative advantages, main directions of development.

Introdaction

The aim of our research is to study the intensity of economic relations between the countries of Southern Caucasus and also between Armenia and Artsakh and to show the opportunities and ways of their further developing according to modern theory of comparative advantages of external product life cycle. The following main issues are set based on the above mentioned:

1. The sense of economic integration of Southern Caucasus and other regional countries,
2. The economic losses of Southern Caucasus and other regional countries due to the absence of cooperation,
3. The main macroeconomic relations of the Republic of Armenia and Artsakh,
4. The main directions of deep specialization of the economy of the Republic of Artsakh.

To explain the essence of economic integration (cooperation) more detailed both at the global and regional levels, let us first consider this concept from the point of view of the participation of the country in the international division of labor. The deepening of the international division of labor inevitably leads to the development of economic cooperation.

Economic integration (cooperation) is the process of developing and sharing stable economic relations between national economies, which, involving external economic exchange and production, leads to the close interwining of national economies and especially to the formation of a unified economic complex on a regional scale.

All the countries of the world are involved in the international division of labor to some extent. Its material basis is the development of production capacity which is affected by the technological revolution. The latter is formed and developed in a single country and then is spread through a competitive struggle encompassing the corresponding region.

International division of labor provides the participating countries with additional economic efficiency and the role of dependence on natural resources is significantly reduced.

The processes of development of economic integration are complex and contradictory. They are influenced by both economic, political, cultural, religious and technological factors. And although the main cause of integration is the economy developed outside the borders of the national economy, conditional integration processes are formed on the basis of a change in the ratio of the factors listed above. Integration processes are carried out at the micro level through signing contracts between companies in neighboring countries and through the establishment of their branches in foreign countries and the co-ordination of respective long-term strategic plans and economic policies based on separate economic unions. Interstate regulation aims at ensuring the free movement of goods and production factors in the area, coordinating and jointly implementing the economic, scientific-technical, financial, monetary, social, foreign and military policies of the participating countries. That is why such a regulation implies the creation of such economic unions between countries that must have a single currency, infrastructure, common financial interests and international or interstate governing bodies. Interstate agreements of countries that are members of the organization of economic integration are regulated by interstate bodies.

So, yet at the beginning of the 19th century when the international movement of the capital was given a big start which was connected with the ordinal formation of world economy, the centre of international economic relations (IER) gradually becomes the sphere of production. The latter shows that the creation of those conditions had been started since the mentioned period which favoured to pass to a qualitatively new international integration of world economic relations which are a contemporary way of IER.

Regional economic integration implies that first the mutual adaptation of national economies, their integration into unified reproductive processes and other objective processes should be taken into account for enhancing sustainable economic relations and division of labor. Mutual economic dependence between the two countries is connected to the benefit of both parties and the breakdown of these relations between them brings to a loss.

The reason for regional economic integration processes is the problem of unification of production resources. Since then, the integration nucleus has gradually become the field of technology. More recently, information and engineering activities have been given a prominent place.

The objects of economic integration are both products, services and all kinds of production resources which are at the same time objects of international production and scientific-technical cooperation and exchange. Economic integration means the development of all forms of international economic relations closely intertwining them on an international (or regional) scale.

Stable and permanent cooperation strengthens the overcoming of the isolation of national economies. Creating a unified economic, legal and information space is a necessary requirement for all economic entities to operate freely and effectively. Globalization has become the essential part of the deep changes in modern times which take place in the system of all kinds of international relations reflected in the strengthening of various spheres of public life and activity including economic interdependence and mutual influence.

Economic integration enables the economic entities to

- Freely use the production resources of participant countries,
- To take into account the capacity of the markets of integration unity before organizing the production of certain product,
- Protect the participant countries from the competition of the third countries,
- Solve those urgent problems all together which are connected with the reduction of unemployment rate, supporting the poor with social grants, further developmet of health care, labor protection and social security.

One of the sgnificant issues of our reality is the growing interdependence of the economies of different countries, the development of integration processes at micro and macro levels and the transition from close national economies to open economies of almost all countries. One of the statements of current development is the interconnected growth of the economies of the countries. The interdependence of countries becomes an essential reality. Regional economic ties are gradually

formed and especially intensified involoving many countries. Economic integration is gaining practical application determining the perspectives of further development of the participant countries. The logic of market economics and theory of classical economics, namely the free exchange of other factors of trade and production, have also contributed to the development of integration processes.

The liberalization of the exchange of production factors (labor, capital, technologies, information and entrepreneurial experience) facilitated the process of adaptation of national economies to external conditions, facilitating their more active involvement in the international division of capital. As a result, a wide distribution of manufacturing forces took place beyond the territorial boundaries. At the same time, this process is concerned with the most important elements of the material and non-material sectors - not only the commodities but also the capital, services, labor and all stages of social production.

Overcoming the barriers between national economies, ensuring openness and their gradual unification of national economies is an essential component which characetrizes the deepening of economic cooperation enabling greater efficiency in solving the problems of socio-economic development of the states. Or, in other words, regional economic integration has now become one of the key conditions for the economic growth and rising the living standards of the participating countries.

The rapid rise of productive forces leading to unprecedented growth of production and consumption creates problems at the same time often in global scale such as environmental protection the failure of timely solution of which can be fatal to the national economy.

Within the framework of economic integration the countries set similiar tasks. Among them are

- Carrying out the advantages of economy. It enables to involve foreign direct investments which are collected more in the countries with large scale markets. In such cases, it also makes sense to create self-sufficient areas to meet market demands.
- Creating a favorable innerpolitical environment. Cooperation of participating countries in political, military, social, cultural and other non-economic spheres.Geographically neighboring countries with similar problems of development and good relations with economic commitments and which have political monopoly.
- Solving issues of trade policy. The regional cooperation is often seen as a means of strengthening the positions of countries involved in multilateral trade negotiations at the World Trade Organization. The coordinated speeches by a number of countries have more weight which has desirable results in trade policy. Moreover, regional unions allow to create a more stable and predictable environment for trade than multilateral negotiations where the interests of participants significantly differ from each other.
- The impact of structural reforms of economy. The integration of countries that create market economies or implement economic transformations into trade agreements of countries with high levels of regional market development is seen as an important means of exchange of market experience. It is also a guarantee that the chosen marketing means is unchangeable. The more developed countries joining the cooperation process are also interested in accelerating market reforms to create full and expended markets.
- Sponsorship of new branches of national industry. Even if integrating countries do not envisage discriminatory policies towards the third countries, the same cannot be said for encouraging local producers as they are opening a larger regional market.

Regional economic integration can be viewed from two perspectives - both as a process and as a situation. Regional economic integration, as a process, is the implementation of measures aimed at eliminating as much discrimination as possible between the economic units of different states and, as a situation, excluding different forms of discrimination between national economies.

Thus, the process of economic cooperation between countries leads to closer economic mechanisms. Its preconditions are the relevance of the levels of market development of the participating countries, the geographical close position of those countries, the generality of the problems they face, the purpose of accelerating market transformation and the desire to stay out of the

ongoing cooperation processes. Economic cooperation occurs to use the benefits of the single market, to create favorable conditions for the development of the country to strengthen its participation in international economic agreements, to exchange market experience and to encourage the development of national industry and agriculture.

Depending on the political, economic, historical, geographical, national, cultural and other features, economic integration between countries in the world economy occurs in two directions: global and regional. Because of the above mentioned reasons, economic cooperation processes in different parts of the world are moving at different speeds, that is why countries that have a similar level of economic development also have similar methods of managing the economy and are close to one another geographically and culturally, they form regional integration organizations within them they are more integrated to deepen economic cooperation among themselves thus remaining part of the global economy.

If the task of provision of integration of national economy into world economy is a very long process, then within certain regional framework it will change very quickly as a result of the opportunity of overcoming the obstacles between economies.

So, the international economic integration may be defined as objctively recognized process during which adaptation and intertwinning of national economies in the basis of which the international cooperation and the export of the capital of self acting economic entities lies[18].

1. The significance of economic intergartion of South Caucasus and other countries of the region

Let us discuss more specifically (based on statistical data) the number of indicators characterizing the current state of economic integration between the South Caucasus countries distinguishing among them the Republic of Armenia and the countries of region (including the Eurasian Economic Union (EAEU) and the four neighboring countries of the Republic of Armenia) [1] (p. 120-162). The most important indicator of regional cooperation is the trade in goods and services between the countries of the region (Table 1). The study of the structure of foreign trade of the Republic of Armenia and other countries of the South Caucasus region shows that the share of countries of EAEU in the export structure of the RA is 28,3% while the import comprises 26,0%. It is noteworthy that the Russian Federation has the largest share of these indicators. As for the neighboring countries of the Republic of Armenia, the share of these countries in the total export index made up 6,8% in 2018 and in the import - 11.8%. The figures above show weak foreign trade between Armenia and other countries of the region.

Table 1

External trade between RA and South Caucasus and other countries of the region and its structure in 2018

	Export, thousand USA dollars	Import, thousand USA dollars r	Export structure, % to the total	Import structure, % to the total
1	2	3	4	5
TOTAL	2,412,432.7	5,015,544.3	100.0	100.0
Among which				
CIC countries	719,026.9	1,492,903.6	29.8	29.8
Among them				
EAEU countries	688,473.6	1,302,499.9	28.5	26.0
Among them				

[18] A. Markosyan, G. Nazaryan, D. Hakhverdyan, International economic relations, Manual, two parts, Yerevan, YSTAC, 2012, part 2, p. 494.

1	2	3	4	5
Russian Federation	665,768.6	1,259,897.1	27.6	25.1
Belarus	11,942.9	38,610.2	0.5	0.8
Kazakhstan	9,791.6	3,692.4	0.4	0.1
Kirgizistan	970.5	300.2	0.0	0.0
Other countries of CIC	30,553.3	190,403.7	1.3	3.8
Among them				
Ukraine	18,255.8	153,629.9	0.8	3.1
Turkmenistan	3,079.8	27,468.0	0.1	0.5
Uzbekistan	2,440.2	2,562.5	0.1	0.1
Other countries	6,777.5	6,743.3	0.3	0.1
EU 28 countries	683,409.2	1,155,298.8	28.3	23.0
Other countries	1,009,996.5	2,367,341.9	41.9	47.2
Among them				
Gerogia	68,685.5	70,774.3	2.8	1.4
Iran Islamic Republic	94,203.6	269,341.4	3.9	5.4
Turkey	2,527.7	252,594.2	0.1	5.0

Formed and calculated on the Social-economic situation of the Republic of Armenia in 2019 January–May, Yerevan, RA, 2019, p. 104-105

The next important spheres of regional integration (cooperation) are invetsments.The study of the volumes and structure of net inflows of foreign investments in the real sector of the Republic of Armenia by South Caucasus and other countries in the region in 2017-2018 (Table 2) shows that if in 2017 the share of EAEU countries was -13.0% (which means that investments were out of Armenia), then in 2018 this figure was 53,8% (which means that investments flew into Armenia). These indicators for the neighboring countries of the Republic of Armenia were 0% and -1,2%, respectively.

Table 2

The volumes and structures of net flows of foreign investments in RA real sector by Southern Caucasus and other countries of the region in 2017-2018

	2017 January-December, net flows				**2018 January-December, net flows**			
	Investments, total, mln AMD	**%- to the total**	**Direct investments, mln. AMD**	**By %- in direct investments**	**Total investments, mln. AMd**	**By % to the total**	**Direct investment, mln AMD**	**By %- in direct investment**
1	2	3	4	5	6	7	8	9
Total	**74,619.9**	**100.0**	**93,043.9**	**100.0**	**27,581.4**	**100.0**	**111,870.5**	**100.0**
Including								
EAEU countries total	-9,560.0	-12.8	-12,070.5	-13.0	43,608.2	158.1	60,194.2	53.8
Russian Federation	-9,752.3	-13.1	-12,073.1	-13.0	43,507.1	157.7	60,194.3	53.8
Belarus	192.3	0.3	2.6	0.0	101.1	0.4	-0.1	-0.0
Kazakhstan	-	-	-	-	-	-	-	-
Kirgizistan	-	-	-	-	-	-	-	-

1	2	3	4	5	6	7	8	9
RA neighboring countries, total	-212.3	-0.3	2.2	0.0	1,764.8	6.4	-1,389.9	-1.2
Including								
Iran Islamic Republic	-31.3	-0.0	85.8	0.1	-149.9	-0.5	-	-
Georgia	-181.0	-0.2	-83.6	-0.1	2,534.6	9.2	-770.0	-0.7
Turkey	-	-	-	-	-	-	-	-
Azerbayjan	-	-	-	-	-	-	-	-
Artsakh Republic	-	-	-	-	-619.9	-2.2	-619.9	-0.6

Formed and calculated on the Social-economic situation of the Republic of Armenia in 2019 January–February, Yerevan, RA, 2019, p. 94-95

One of the most important indicators of regional economic integration relates to transfers of individuals to non-commercial countries through the RA banking system (Table 3).The study of the data shows that the majority of transfers to individuals for non-commercial purposes through the Armenian banking system refers mainly to the Russian Federation and the USA and the share of neighboring countries of the Republic of Armenia is not large. As for the full data for this indicator for 2018, according to the Central Bank of Armenia, total inflow was $ 1785,6 million, outflow - $ 1188,4 million and net inflow - $ 597,2 million. From these amounts, Russian share was $ 1050,0 million (or 58,8% of the total), $ 471,7 million (39,7%) and $ 578,3 million (96.8%) respectively.

Table 3

The structure and non commercial transfers to individuals through banking system of RA according to countries in 2016 - 2017

Country	2017			2016		
	Inflow	Outflow	Net inflow	Inflow	Outflow	Net inflow
1	2	3	4	5	6	7
Total	1756485	1024993	731492	1532883	816982	715901
	100.0	100.0	100.0	100.0	100.0	100.0
Russian Federation	1064984	376132	688853	896916	333400	563516
	60.6	36.7	94.2	58.5	40.8	78.7
USA	183253	196322	-13068	176569	83862	92707
	10.4	19.2	-1.8	11.5	10.3	12.9
Ukraine	9102	13649	-4547	9298	10705	-1407
	0.5	1.3	-0.6	0.6	1.3	-0.2
Kazakhstan	46839	2625	44214	18894	4368	14526
	2.7	0.3	6.0	1.2	0.5	2.0
Germany	38568	28866	9702	52134	23776	28358
	2.2	2.8	1.3	3.4	2.9	4.0
Spain	9891	19387	-9496	8839	12544	-3705
	0.6	1.9	-1.3	0.6	1.5	-0.5
France	26291	15427	10864	30365	14589	15776
	1.5	1.5	1.5	2.0	1.8	2.2
UAE	27105	21393	5712	19509	22896	-3386
	1.5	2.1	0.8	1.3	2.8	-0.5
China	4454	64710	-60257	2939	56629	-53690
	0.3	6.3	-8.2	0.2	6.9	-7.5

1	2	3	4	5	6	7
Turkey	1446	10306	-8860	2517	8154	-5637
	0.1	1.0	-1.2	0.2	1.0	-0.8
Other countries	344550	276176	68374	314903	246058	68845
	19.6	26.9	9.3	20.5	30.1	9.6

* Numerator thousand US dollars, denominator by %- to the total

Source formed and calculated by RA Central Bank (https://www.cba.am/am/SitePages/pperiodicals.aspx) 20.08.2019 data

Consequently, the above mentioned study shows that the regional cooperation of the Republic of Armenia needs significant improvements and changes taking into account the application of new forms and structures of partnership and the search for new markets and partner countries.

2. Economic losses of Southern Caucasus and other countries of the region due to lack of cooperation

The study of the external trade turnover of small and open economies in particular and the effectiveness of these relationships with other countries should first start by measuring the main macroeconomic indicators characterizing the exchange of goods, services and capitals of the countries and then build the macroeconomic model that shows the relationship between these variables and after by applying this model, to examine how economic policies in given and other countries affect goods, services and flows of capitals.The basis for the economic analysis is the balance of the payments of the country under this approach [2] (p. 332), [3] (p. 274-281).

The balance of payments is the systematic record of the results of all economic transactions between residents of a given country and other countries around the world (usually within a year as a rule). The balance of payments shows non individual but gross transactions between the given country and other countries of the world, it is an important orientation for the development of macroeconomic policies (including fiscal, monetary, foreign trade and foreign exchange).

The difference in the balance of payments of the RA over the past years for many objective and subjective reasons was a negative dimension (by the way, the causes of such causal relationships and their quantitative assessment is a separate research issue related to at least a decrease in the balance of payments). Table 4 lists the individual items of the balance of payments (annual) of the Republic of Armenia and the balance sheet for 2000-2018 which shows that although the difference in the balance of payments in the last years (2017-2018) compared to 2010 has declined significantly, but it remains high. As for the figures for 2015-2016, this indicator at first glance seeming to have been improved, but has been achieved as a result of the slowdown in the economic growth (in 2016 the economic growth of Armenia rate was 0,2% which is the lowest in the post-crisis period and the index of Consumer Price- 98,6% which means deflation). It is also obvious that the difference in the balance of payments in the RA is mainly due to the current account (the difference between export and import of goods and services).

Table 4

Articles of RA payment balance (annual) and difference between balance in 2000-2018, mln. USD

Index	2000	2005	2010	2015	2016	2017	2018
1	2	3	4	5	6	7	8
Goods and services	-531.8	-782.6	-2,326.5	-1,281.8	-1,015.8	-1,403.3	-1,913.8
Goods	-466.9	-634.7	-2,065.7	-1,186.4	-944.4	-1,375.4	-1,766.0
Services	-64.8	-147.9	-260.8	-95.4	-71.4	-27.9	-147.8
Initial revenues	59.0	206.0	458.3	442.9	224.2	463.3	162.1
Secondary revenues	171.1	452.7	606.8	566.5	553.4	660.3	621.1
2. Capital balance	13.0	84.0	98.9	65.3	34.9	46.3	67.6
3. Financial balance	-216.1	-203.3	-1,318.5	-356.5	-431.6	-540.1	-689.2

1	2	3	4	5	6	7	8
Storage actives	19.2	214.0	-128.7	332.9	454.6	49.8	-46.3
Pure mistakes and omissions	72.6	-163.4	-155.9	-149.3	-228.3	-306.7	373.8
Difference of payment balance	**-413.0**	**-192.7**	**-2,765.7**	**-380.0**	**-408.5**	**-1,030.4**	**-1,424.8**

Source by data of RA Central bank on 22.08.2019, website source https://www.cba.am/am/SitePages/statexternalsector.aspx

And why the improvement of the difference of transactions of export and import of goods and services is highlighted. The answer to this question as as follows: nowadays any country uses the rate of gross domestic product (GDP) to estimate the results of economic activity which is defined by the following formula

$GDP = C + I + G \pm \Delta E$,

Where

C – is the volume of the consumption by the society

I – is the total (general) investments

G –is the governmental costs

ΔE – is net export (difference between export and import).

We may conclude from the formula that the dimension of GDP is directly dependent on the difference of export and import of goods and services, it means that if the amount of export and import exceeds their import, then the dimension of GDP increases and in the case of their deficiency the dimension of GDP decreases. That is why all the countries of the world try to increase the amount of export and not that of import with quick steps.

How is the cooperation between two or more nations (states) implemented and what is the criterion of its effectiveness? Or from which country the product or service should be purchased or should they be produced in the country of origin being the same? The answer to this question was given by the founders of classical economics and then supplemented and updated by the efforts of other economists. If we answer briefly the above questions, the basis of cooperation is the theory of absolute and comparative advantage of countries. Without deepening and detailing into all of their nuances and aspects (revealing them and applying them in the policy of socio-economic development of the country is another study), it should be noted that, according to the theory of comparative advantage, the coefficient of relative (comparative) advantage of the country (UBA) characterizes the degree of specialization of the given product or service and is calculated by the following formula:

$$CCA = \frac{Advantage}{A+I} \times 100,$$

Where CCA is the coefficient of comparative advantages, A –is the volume of export, I-is the import [4] (p. 18-26).

CCA fluctuates between the interval [-1, +1] or [-100, +100] (in case of percentage). In this case CCA is -1 or -100 when the country only imports and it is +1 or +100 when the counrty only exports. The closer the CCA of any country is to +100-ի, the higher is the degree of specialization of that country and vice versa. As the CCA compresses the whole potential of export and import of goods and services of the counrty in itself, then it also compresses the quality of macro and micro economics and also megaeconomics of the country.

Specifying the above mentioned for RA 2017-2018 according to the example of foreign trade of other countries, our calculations are summarized in Appendix 1. The CCA of the product groups with the enlarged nomenclature of RA are given in Table 6.

It can be seen from the data in Appendix 1 the overwhelming majority of the CCAs of the RA external trade turnover by individual countries had negatively high values both in 2017 and 2018. At the same time, this indicator for 2018 had significantly worsened compared to 2017. In 2018, the CCAs of the RA foreign trade turnover were positive with Kazakhstan, Kirgizstan, Belgium, Bulgaria,

Romania, the Netherlands, Switzerland, Iraq and Canada. This means that Armenia should deepen and expand trade and economic relations with these countries as our country gains benefits not losses from this cooperation. As for the CCAs of RA and neighboring countries, it was -0,010 with Georgia, -0,482 with Iran and -0,980 with Turkey. It is obvious that foreign trade of Armenia with its neighboring countries needs to be substantially improved in terms of significantly increasing export volumes.

In order to find out the efficiency of the foreign trade turnover of the Republic of Armenia by commodity divisions, Table 5 shows the values of this indicator (CCAs) for 2017-2018. The data in Table 5 suggest that when designing the commodity turnover policy of the republic by product group, priority should be given to those commodities whose CCAs are close to +1.

Table 5

Export and import volumes of RA and their CCA according to product share in 2017-2018

	2017			**2018**		
	Export, thousand of USD	Import, thousand of USD	CCA	Export, thousand of USD	Import, thousand of USD	CCA
1	2	3	4	5	6	7
T O T A L	**2,237,697.6**	**4,097,065.7**	**-0.294**	**2,411,934.8**	**4,963,227.3**	**-0.346**
Including						
Animals and products of organic origin	58,538.9	133,668.6	-0.391	50,640.2	131,826.8	-0.445
Products of herbal origin	63,360.5	190,768.1	-0.501	93,655.9	217,910.7	-0.399
Fats and oils of organic and herbal origin	115.5	49,155.1	-0.995	77.0	55,023.7	-0.997
Production of ready made food	524,123.3	353,075.7	0.195	553,358.5	399,669.9	0.161
Raw mineral production	675,922.7	644,914.4	0.023	644,368.0	718,554.2	-0.054
Production of chemistry and related industries	29,521.5	406,878.1	-0.865	28,456.4	395,977.8	-0.866
Polyethilen and objects made of it, rubber objects	10,283.6	171,710.2	-0.887	14,275.5	199,626.0	-0.867
Leather raw, fur and objects made of it	10,345.9	19,361.9	-0.303	13,723.9	24,370.1	-0.279
Wood and wooden objects	2,347.0	45,488.3	-0.902	1,927.0	56,540.9	-0.934
Paper and paper things	1,187.8	77,408.0	-0.970	1,356.5	92,128.2	-0.971
Knitted things	136,084.0	263,599.2	-0.319	225,035.3	318,123.9	-0.171
Shoes, hats, umbrellas	2,829.7	45,659.3	-0.883	4,476.2	57,228.3	-0.855
Objects made of stone, wax, cement	16,008.7	86,771.5	-0.688	24,181.7	93,952.3	-0.591
Precious and semi precious metals and objects made of them	291,027.4	233,407.8	0.110	306,355.2	286,242.7	0.034
Non precious metals and objects	268,838.7	291,969.4	-0.041	296,610.8	340,081.2	-0.068
Cars, equipment and mechanisms	41,399.5	628,435.4	-0.876	43,596.2	935,308.5	-0.911

1	2	3	4	5	6	7
Land, air and water transport means	15,876.4	247,683.1	-0.880	26,283.5	362,133.3	-0.865
Tools and apparatus	39,378.5	83,645.6	-0.360	52,800.5	118,260.1	-0.383
Various industrial goods	49,610.6	123,206.5	-0.426	30,046.6	160,064.6	-0.684
Works of art	897.5	259.6	0.551	709.9	204.2	0.553

Source by the social – economic situation of the Republic of Armenia in January-December 2018, Yerevan, RA, 2019, p. 132

The study presented in this part of the work shows a significant gap between the export and import of goods and services between the regional countries which results in outflow of significant resources from our republic to foreign countries.

It is also obvious that the reasons of such a situation in the republic are many and various. They include geopolitical, economic, social, historical and other factors. There is no doubt that the Republic of Armenia suffers significant economic losses due to the well-known conflicts with the neighboring republics.

The low level of economic integration between the countries of the South Caucasus region is particularly evidenced by the data presented in Table 6. It is enough to note that, for example, exports of regional countries to South Caucasus in 2010 comprised 5,92% of total exports (US $ 3519,3 million) and to neighboring countries respectively – 15,3% (US $ 24123,2 million), imports made up 0,79% (US $ 2011,1 million) and 8,97% (US $ 22711.7 million) respectively. These same figures (as the data for 2015 are not available for the Islamic Republic of Iran and Azerbaijan, hence the data for 2014 were taken) made up 3,3% (US $ 8567,5 million) and 0,6% (US $ 1879,2 million) respectively and 1,5% (US $ 3662,7 million) and 8,0% (US $ 19252,3 million) in 2017 and imports – 0,6% (US $ 1626,9 million) and 8,5% (US $ 21535,3 million). It is also interesting to note that in the created situation Georgia is sharply improving its rates compared to that of Armenia and Azerbaijan.

Table 6

The amount of interregional export and import of South Caucasus countries in 2005-2017

Countries	Export					Import				
	Total	South Caucasus		Neighboring countries		Total	South Caucasus		Neighboring countries	
	Mln. USD	Mln. USD	%	Mln. USD	%	Mln. USD	Mln. USD	%	Mln. USD	%
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
2005										
Armenia	882.8	34.1	3.9	59.7	6.8	1641.4	39.3	2.4	193.4	11.8
Georgia	845.7	122.9	14.5	402.7	47.6	2435.6	272.7	11.2	963.6	39.6
Azerbaijan	8318.7	0.7	0.0	6.2	0.1	7806.6	256.3	3.3	351.1	4.5
Iran	37339.7	523.9	1.4	3240.4	8.7	38072.4	175.4	0.5	1391.6	3.7
Turkey	69942.5	799.9	1.1	6292.7	9.0	113850.5	575.6	0.5	8169.1	7.2
Total	**117329.4**	**1481.5**	**1.26**	**10001.7**	**8.52**	**163806.5**	**1319.3**	**0.81**	**11068.8**	**6.76**
2010										
Armenia	973.6	48.2	5.0	88.5	9.1	3606.9	49.7	1.4	478.0	13.3
Georgia	1278.0	176.8	13.8	414.8	32.5	4747.1	568.2	12.0	1746.2	36.8
Azerbaijan	20765.3	411.0	2.0	1480.4	7.1	6092.0	50.4	0.8	2085.1	34.2
Iran	25418.3	562.6	2.2	8774.4	34.5	53328.5	184.5	0.3	3197.0	6.0
Turkey	109670.1	2320.7	2.1	13365.1	12.2	185523.7	1158.3	0.6	15205.4	8.2
Total	**158105.3**	**3519.3**	**5.92**	**24123.2**	**15.3**	**253298.2**	**2011.1**	**0.79**	**22711.7**	**8.97**

1	2	3	4	5	6	7	8	9	10	11
2015										
Armenia	1482.7	66.7	4.5	192.0	12.9	3257.0	114.0	3.5	401.5	12.3
Georgia	20720.3	6674.0	32.2	19833.6	95.7	1792.7	1892.8	105.6	2409.1	134.4
Azerbaijan	11326.8	449.1	4.0	1458.1	12.9	9211.1	68.0	0.7	2767.7	30.0
Iran	-	-	-	-	-	-	-	-	-	-
Turkey	143935.0	6674.0	4.6	19833.57	13.8	207203.4	6551.7	3.2	11014.0	5.3
Total	**177464.8**	**13863.8**	**7.8**	**41317.3**	**23.3**	**221464.2**	**8626.5**	**3.9**	**16592.3**	**7.5**
2017										
Armenia	2041.3	143.2	7.0	225.9	11.1	4076.7	92.9	2.3	500.3	12.3
Georgia	2727.9	480.9	17.6	1092.2	40.0	7982.4	891.1	11.2	3054.5	38.3
Azerbaijan	13797.7	471.3	3.4	2441.4	17.69	8766.5	74.6	0.9	3069.1	35.01
Iran	66361.7	-	-	-	-	51781,0	-	-	-	-
Turkey	157055	2567.33	1.6	15492.8	9.9	233792	568.3	0.2	14911.4	6.4
Total	**241983.6**	**3662.7**	**1.5**	**19252.3**	**8.0**	**254617.6**	**1626.9**	**0.6**	**21535.3**	**8.5**
Total 2005-2017										
Armenia	16675.3	959.9	5.8	1786.9	10.7	44935.6	978.1	2.2	5549.6	12.4
Georgia	168023.5	13772.4	8.2	41154.4	24.5	267439.1	12049.3	4.5	71190.2	26.6
Azerbaijan	232652.3	5345.3	2.3	22840.5	9.8	101407.0	1167.1	1.2	31858.0	31.4
Iran	370579.1	9285.6	2.5	50127.4	13.5	257630.9	788.6	0.3	13139.0	5.1
Turkey	1631281.0	34066.8	2.1	211360.8	13.0	2554619.1	15261.4	0.6	171509.8	6.7
Total	**2485572.9**	**63430.3**	**2.6**	**327270.0**	**13.2**	**3226031.7**	**30244.5**	**0.9**	**293246.6**	**9.1**

Source by www.intracen.org www.armstat.am. and the rates of 2011-2012 by www.armstat.am and www.trademap.org data

Note. The neighboring countries of **Iran Islamic Republic** are Azerbaijan, Turkey, Afghanistan, Turkmenistan, Iraq, Pakistan, Syria, Armenia, Kuwait

The neighboring countries of **Turkey** are Azerbaijan, Bulgaria, Iran, Cyprus, Armenia, Greece, Saudi Arabia, Syria, Georgia

The neighboring countries of **Georgia** are the Russian Federation, Azerbaijan, Armenia, Turkey

The neighboring countries of **Azerbaijan** are the Russian Federation, Armenia, Georgia, Turkey, Iran

The main macroeconomic relations of the Republic of Artsakh and Armenia

One of the important directions for establishing sustainable economic relations between the Republic of Armenia and the Republic of Artsakh (except for investment, labor and technology flows and movements) is external turnover which is carried out through the absolute and comparative advantages of the trading countries. In addition, the latter is calculated by means of coefficients of comparative advantage (CCAs) calculated by the ratio of export and foreign trade turnover according to which these coefficients fluctuate in the interval of [+1, -1]. CCAs describe how countries specialize (the closer they are to + 1, the higher the degree of specialization of countries is which means that it is more advisable to trade with that country). And closer CCAs are to -1, the lower the degree of specialization of countries is with resulting consequences [5] (p. 410-445), [6] (p. 62-71).

The data presented in Table 7 shows that in 2016 the export of the Republic of Armenia increased by 133,6% compared to 2011, import was increased by 79,4%, foreign trade turnover by 86.1% and the remain of foreign trade turnover by 75.3%, CCA by 95,4%. These figures for Artsakh Republic were 101,9%, 82,0%, 92,6%, 53,7% and 57,9% respectively. The indicators can be described as positive.

The data in Table 8 show that the share of Artsakh in the total GDP of the Republic of Armenia and the Republic of Artsakh comprised 4,3% in 2001 instead of 2,0% in 2016 being the highest rate. At the same time, the share of export of the Republic of Artsakh made 1,6% and import – 5,1% respectively. According to the data from the total of 2001-2016 these rates made up 3,2% of GDP, export – 4,6% and import – 6,2%. Although the share of the Republic of Artsakh in the GDP of the Republic of Armenia and Artsakh increased by 2.3 percent in 2001-2016, the export by 2,7 percent

and the import by 2,2 percent, it means that the increase of the share of the export of the Republic of Artsakh increased by 1,2 times of the import share which can also be described as a positive trend.

The facts show the deepening of integration of GDP and foreign trade turnover between the two Armenian republics. This is also evidenced by the data in Table 9 which shows that the share of RA in the foreign trade of the Republic of Armenia made up 88,8% in 2016 from 64,1% in 2001 (growth was 24,7 percent).

Table 7

Foreign trade turnover of the Republic of Armenia and the Republic of Artsakh and the coefficients of comparative advantages in 2012-2017

	2012		2013		2014		2015		2016		2017	
	Armenia	Artsakh	Armenia	Artsakh	Armenia	Artsakh	Armenia	Artsakh	Armenia	Artsakh	Armenia	Artsakh
Export, thousand of dollars	1380199.2	57765.7	1478748.6	59636.4	1547286.8	64663.6	1485331.9	62082.2	1791721.7	81106.3	2242868.8	156601.2
Import, thousand of dollars	4261232.7	291246.5	4385865.9	268833.2	4424424.3	301986.9	3239238.7	252474.9	3273469.3	256859.2	4182660.9	287876.1
Saldo of external trade, thousand of dollars	-233480.8	-2881034	-209196.8	-2907117	-237323.3	-2877138	-190392.7	-1753907	-1481747.6	-175752.9	-1939792.1	-131274.9
External trade turnover, thousand of dollars	349012.1	5641432	328469.6	5864615	366650.5	5971711	314557.1	4724571	5065191.0	337965.5	6425529.7	444477.3
CCA	**-0.669**	**-0.510**	**-0.637**	**-0.496**	**-0.647**	**-0.482**	**-0.605**	**-0.371**	**-0.293**	**-0.520**	**-0.302**	**-0.295**

Source by data of RA NSS and RA NSS

Table 8

Foreign trade of the Republic of Artsakh and the Republic of Armenia in 2001-2017
Mln. USD

	Republic of Armenia			Republic of Artsakh			Armenia and Artsakh			Share of Artsakh in total, %		
	GDP	Export	Import	GDP	Export	Import	GDP	Export	Import	GDP	Export	Import
2001	2118	341.8	877.4	43.0	5.5	47.2	2161	347.3	924.6	2.0	1.6	5.1
2002	2376	505.2	987.2	46.2	14.1	48.1	2422.2	519.3	1035.3	1.9	2.7	4.6
2003	2807	685.6	1279.5	58.5	29.3	54.3	2865.5	714.9	1333.8	2.0	4.1	4.1
2004	3577	722.9	1350.7	80.3	39.1	76.5	3657.3	762	1427.2	2.2	5.1	5.4
2005	4900	973.9	1801.7	112.3	38.2	94.9	5012.3	1012.1	1896.6	2.2	3.8	5.0
2006	6384	985.1	2191.6	148.7	45.3	113.2	6532.7	1030.4	2304.8	2.3	4.4	4.9
2007	9206	1152.3	3267.8	206.9	72.5	204.8	9412.9	1224.8	3472.6	2.2	5.9	5.9
2008	11662	1057.2	4426.1	284.8	55.1	250.0	11946.8	1112.3	4676.1	2.4	5.0	5.3
2009	8648	710.2	3321.1	281.7	57.3	236.6	8929.7	767.5	3557.7	3.2	7.5	6.7
2010	9260	1041.1	3748.9	316.2	74.8	273.4	9576.2	1115.9	4022.3	3.3	6.7	6.8
2011	10142	1334.3	4145.3	363.8	79.6	313.1	10505.8	1413.9	4458.4	3.5	5.6	7.0
2012	10619	1380.2	4261.2	373.5	57.8	291.2	10992.5	1438	4552.4	3.6	3.9	6.4
2013	11121	1478.7	4385.9	411.5	59.6	268.8	11532.5	1538.3	4654.7	3.6	3.9	5.8
2014	11610	1547.3	4424.4	454.0	64.7	302.0	12064	1612	4726.4	3.8	4.0	6.4
2015	10529	1485.3	3239.2	438.0	62.1	252.5	10967	1547.4	3491.7	4.0	4.0	7.2
2016	10547	1791.7	3273.5	478.0	81.1	256.9	11025	1872.8	3530.4	4.3	4.3	7.3
2017	11560	2242.9	4182.7	563.7	156.6	287.9	12123.7	2399.5	4470.6	4.6	6.5	6.4
Total 2001-2017	**137066**	**19435.7**	**51164.2**	**4661.1**	**992.7**	**3371.4**	**141727.1**	**20428.4**	**54535.6**	**3.3**	**4.9**	**6.2**

Source by data of RA NSS and RA NSS

Table 9

The integration of foreign trade turnover of Armenia and Artsakh in 2001-2017

	Armenia, mln. USD			Artsakh, mln. USD			Trade of Artsakh Republic with Republic of Armenia, mln. USD			Share of Artsakh in foreign turnover with Armenia, %		
	Foreign turnover	Export	Import	Foreign turnover	Export	Import	Foreign turnover	Export	Import	Foreign turnover	Export	Import
2001	1219.2	341.8	877.4	52.7	5.5	47.2	33.8	2.0	31.8	64.1	36.4	67.4
2002	1492.4	505.2	987.2	62.2	14.1	48.1	38.6	3.7	34.9	62.1	26.2	72.6
2003	1965.1	685.6	1279.5	83.6	29.3	54.3	47.3	10.7	36.6	56.6	36.5	67.4
2004	2073.6	722.9	1350.7	115.6	39.1	76.5	91.1	26.7	64.3	78.8	68.3	84.1
2005	2775.6	973.9	1801.7	133.1	38.2	94.9	108.5	25.7	82.8	81.5	67.3	87.2
2006	3176.7	985.1	2191.6	158.5	45.3	113.2	152.6	43.1	109.4	96.3	95.1	96.6
2007	4420.1	1152.3	3267.8	277.3	72.5	204.8	257.7	70.3	187.4	92.9	97.0	91.5
2008	5483.3	1057.2	4426.1	305.1	55.1	250	284.6	49.8	234.8	93.3	90.4	93.9
2009	4031.3	710.2	3321.1	293.9	57.3	236.6	273.0	53.0	219.9	92.9	92.5	92.9
2010	4790.1	1041.1	3749	348.2	74.8	273.4	326.6	69.0	257.6	93.8	92.2	94.2
2011	5479.6	1334.3	4145.3	392.7	79.6	313.1	362.5	71.4	291.2	92.3	89.7	93.0
2012	5694.9	1380.1	4261.2	349	57.8	291.2	317.4	47.1	270.3	90.9	81.5	92.8
2013	5864.6	1478.7	4385.9	328.5	59.6	268.8	305.6	50.7	254.9	93.0	85.1	94.8
2014	5971.7	1547.3	4424.4	366.7	64.7	302.0	338.2	57.1	281.1	92.2	88.3	93.1
2015	4724.5	1485.3	3239.2	314.6	62.1	252.5	293.2	51.1	242.1	93.2	82.3	95.9
2016	5065.2	1791.7	3273.5	338.0	81.1	256.9	300.2	68.0	232.2	88.8	83.8	90.4
2017	6425.5	2242.9	4182.7	444.5	156.6	287.9	401.6	141.5	260.1	90.3	90.4	90.3
Total in 2001-2017	**70653.4**	**19435.6**	**51164.3**	**4364.2**	**992.7**	**3371.4**	**3932.5**	**840.9**	**3091.4**	**90.1**	**84.7**	**91.7**

Source by data of NSS of Armeina and NSS of Artsakh

3. The main directions of deepening the specialization of the economy of the Republic of Armenia

The data in Table 10 are remarkable in the way they essentially characterize the degree of specialization of the economy of Artsakh Republic. This means that depending on the size of the CCAs we can plan and deepen the level of specialization of the economy of Artsakh Republic. Finally, they can be the basis for the development of both short-term and long-term programs and strategies for the socio-economic development of the Artsakh Republic. It is also obvious that product groups whose CCAs are small (close to -1) and there is wish to change them to the positive require both long time and labor, material and financial resources. Such an approach would lead to structural reforms of the economy that would be justified if they increase the rate of export growth of the product group and reduce the volume of appropriate imports.

Based on the above-mentioned approach and principles, we can list the main directions and priorities of professional development of Artsakh Republic (such approach is based on the setting of the product line from the highest CCA to the lowest CCA). Thus, the top ten directions of further development of the specialization of the economy of Artsakh Republic (by product groups) can be as follows: 1. Precious stones and metals (for which the average annual CCA value in 2011-2017 was -0,023), 2. mineral products 3. footwear, umbrellas, hats (-0,131), 4. wood and wooden objects (-0,204), 5. vegetable (-0,344), 6. live animals and animal products (-0,482) 7. ready-made food products (-0,781), 8. oils and fats (-0,790), 9. machinery and equipment (-0,846), and 10. plastic, rubber and rubber products (-0,871). Table 11 lists the foreign trade of the Republic of Armenia by countries for 2017-2018 and their CCAs [7] (p. 374-389).

Table 10

The coefficients of comparative analyses of foreign trade of the Republic of Armenia according to product groups (CCAs) in 2011-2017

	2011	2012	2013	2014	2015	2016	2017	Total 2011-2017
Total including	**-0.595**	**-0.669**	**-0.637**	**-0.647**	**-0.605**	**-0.520**	**-0.295**	**-0.557**
Animals and product of organic origin	-0.733	-0.754	-0.730	-0.430	-0.274	-0.112	-0.231	-0.482
Product of herbal origin	-0.550	-0.284	-0.498	-0.531	-0.463	-0.087	-0.068	-0.344
Fats and oils	-1.000	-0.991	-0.870	-0.969	-0.373	-0.652	-0.454	-0.790
Ready made food	-0.761	-0.777	-0.723	-0.785	-0.793	-0.825	-0.806	-0.781
Mineral products	-0.122	-0.394	-0.366	-0.294	-0.330	-0.099	0.353	-0.121
Chemicals	-0.996	-0.991	-0.989	-0.988	-0.991	-0.978	-0.981	-0.987
Rubber	-0.820	-0.693	-0.906	-0.957	-0.958	-0.999	-0.985	-0.871
Leather	-0.856	-0.934	-0.861	-0.865	-0.926	-0.955	-0.954	-0.921
Wood and wooden objects	-0.550	-0.342	-0.107	-0.230	-0.184	-0.050	0.233	-0.204
Paper and paper objects	-1.000	-1.000	-0.929	-0.971	-0.972	-0.999	-0.990	-0.978
Knitted things	-0.918	-0.976	-0.981	-0.871	-0.780	-0.838	-0.841	-0.892
Footwear, unbrellas, hats	-0.128	-0.276	-0.387	-0.210	-0.160	0.090	0.195	-0.131
Objects made of stone, wax and cement	-0.939	-0.943	-0.829	-0.904	-0.887	-0.905	-0.862	-0.903
Precious stones and metals	0.061	-0.058	-0.020	-0.285	0.584	-0.135	-0.039	-0.023
Cheap metals and objects	-0.700	-0.727	-0.991	-0.959	-0.965	-0.990	-0.991	-0.895
Machines and equipment	-0.949	-0.961	-0.795	-0.826	-0.783	-0.772	-0.838	-0.846
Meas of transport	-0.917	-0.957	-0.730	-0.943	-0.876	-0.931	-0.964	-0.912
Tools and apparatus	-0.976	-0.942	-1.000	-0.886	-0.927	-0.963	-0.989	-0.952
Furniture, toys and other ready made objects	-0.979	-0.986	-0.977	-0.924	-0.934	-0.946	-0.942	-0.957
Works of art, antiquities	-1.000	-1.000	-0.891	-1.000	-0.904	-1.000	-1.000	-0.978

Source by RA NSS yearbook, 2009-2015, Stepanakert, Artsakh, 2016, p. 284-288, www.stat.nkr.am

Table 11

RA foreign trade by countries in 2017-2018 and their CCAs

	2017թ.			2018թ.		
	Export, thousand of US dollars,	Import (according to production origin), thousand of US dollars,	CCA	Export, thousand of US dollars,	Import (according to production origin), thousand of US dollars,	CCA
1	2	3	4	5	6	7
T O T A L	2,237,697.6	4,097,065.7	-0.294	2,411,934.8	4,963,227.3	-0.346
Including						
CIC countries	595,055.8	1,347,813.3	-0.387	719,163.9	1,490,927.7	-0.349
Including						
EAEU countries	570,999.4	1,216,432.1	-0.361	688,975.9	1,300,524.0	-0.307
Including						
Russian Federation	557,256.2	1,173,233.7	-0.356	666,501.7	1,257,942.1	-0.307
Belarus	7,051.2	39,064.9	-0.694	11,736.9	38,589.3	-0.534
Kazakhistan	4,928.2	4,044.6	0.098	9,766.8	3,692.4	0.451
Kirgizistan	1,763.8	88.8	0.904	970.5	300.2	0.528
CIC and other countries	24,056.4	131,381.2	-0.690	30,188.0	190,403.6	-0.726
Including						
Ukraine	10,193.5	115,529.1	-0.838	18,255.8	153,629.9	-0.788
Turkmenistan	6,038.1	10,217.7	-0.257	3,093.4	27,468.0	-0.798
Uzbekistan	2,284.0	1,399.9	0.240	2,440.2	2,562.5	-0.024
Other countries	5,540.8	4,234.5	0.134	6,398.6	6,743.2	-0.026
EU countries	633,757.3	903,807.4	-0.176	683,847.0	1,146,227.3	-0.253
Including						
Austria	1,943.1	20,974.3	-0.830	6,370.5	24,608.3	-0.589
Belgium	45,785.2	43,311.5	0.028	49,202.2	39,445.9	0.110
Bulgaria	282,332.3	39,966.8	0.752	215,270.5	43,771.6	0.662
Dania	735.1	5,546.8	-0.766	1,815.7	7,177.9	-0.596
Finland	1,777.0	23,730.8	-0.861	271.1	33,155.9	-0.984
France	4,740.3	73,539.0	-0.879	8,625.3	110,154.4	-0.855
Germany	133,128.4	201,151.1	-0.203	136,079.3	291,914.0	-0.364
Greece	193.5	48,963.9	-0.992	271.5	64,623.0	-0.992
Hungaria	2,184.3	12,879.3	-0.710	678.9	16,370.1	-0.920
Italy	43,284.8	158,025.1	-0.570	49,877.3	182,623.9	-0.571
Poland	7,947.7	49,302.2	-0.722	8,307.4	43,997.2	-0.682
Romania	3,542.9	8,946.8	-0.433	54,937.3	14,363.9	0.585
The Netherlands	88,605.0	32,911.7	0.458	132,356.2	55,869.5	0.406
United Kingdom	4,937.7	34,720.7	-0.751	7,636.2	39,183.8	-0.674
Spain	1,715.6	35,216.9	-0.907	393.9	36,842.0	-0.979
Cypros	123.0	1,521.3	-0.850	24.6	692.4	-0.931
Chezh Republic	2,589.7	26,749.0	-0.823	2,903.2	40,016.7	-0.865

1	2	3	4	5	6	7
Lithuania	1,931.0	5,602.0	-0.487	2,012.9	6,377.6	-0.520
Slovenia	106.5	9,070.9	-0.977	399.3	9,379.7	-0.918
Sweeden	796.1	28,593.3	-0.946	367.9	28,516.5	-0.975
EU other countries	5,358.0	43,084.0	-0.779	6,045.8	57,143.0	-0.809
Other countries	1,008,884.5	1,845,445.0	-0.293	1,008,923.9	2,326,072.3	-0.395
Including						
Repubic of Korea	1,807.0	22,069.8	-0.849	357.6	35,078.9	-0.980
United States	66,187.5	133,446.1	-0.337	47,675.2	178,392.3	-0.578
United Arabic Emirates	102,206.8	96,458.4	0.029	73,826.0	105,833.0	-0.178
Iran Islamic Republic	84,123.2	174,698.2	-0.350	94,203.6	269,417.3	-0.482
Turkey	913.3	222,920.8	-0.992	2,527.7	252,682.1	-0.980
Switzerland	261,389.3	96,446.6	0.461	336,378.2	128,793.4	0.446
China	118,529.4	477,701.5	-0.602	107,222.4	663,855.5	-0.722
Brazil	6.3	62,571.4	-1.000	75.2	61,728.6	-0.998
Japan	366.1	81,021.2	-0.991	375.4	99,060.6	-0.992
Iraq	117,449.3	201.9	0.997	150,638.0	4,959.9	0.936
Thailand	8,998.7	22,416.2	-0.427	788.1	22,860.7	-0.933
Canada	14,994.8	76,572.1	-0.672	33,233.7	30,081.1	0.050
Georgia	152,892.5	88,023.7	0.269	68,696.2	70,105.8	-0.010
Other countries	79,020.3	290,897.1	-0.573	92,926.6	403,223.1	-0.625

Source by The social-economic situation in Armenia in 2018 January-December, Yerevan, RA, 2019, p. 128-129

Conclusion

The research shows that the foreign trade turnover between the South Caucasus countries is «weak» and needs to be substantially activated which will contribute to the deepening of economic integration between other countries and the increase of rates of economic growth. Especially for Armenia and Artsakh the main regional way is export of goods and services which will significantly improve the payment balances of the countries.

In terms of enhancing the effectiveness of regional cooperation, it is important to identify and apply the comparative advantages of each country which can lead to both bilateral and multilateral outcomes. From this point of view, it is particularly important to identify and rank the comparative advantages of the foreign trade turnover of the economies of Armenia and Artsakh by product groups and rank them as priorities of development.

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ՀԱՐԱՎԱՅԻՆ ԿՈՎԿԱՍԻ ՏԱՐԱԾԱՇՐՋԱՆԻ, ՀԱՅԱՍՏԱՆԻ ԵՎ ԱՐՑԱԽԻ ՏՆՏԵՍԱԿԱՆ ՀԱՄԱԳՈՐԾԱԿՑՈՒԹՅԱՆ ՏԵՍԼԱԿԱՆԸ

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Ներկայումս Երկիր մոլորակի տնտեսական տարածքը բաժանված է տարբեր տնտեսական-քաղաքական միությունների միջև: Պայքարը տարածքի յուրաքանչյուր քառակուսի մետրի համար այնպես է սրվել, որ կարելի է համոզված պնդել, որ յուրաքանչյուր քառակուսի մետրը «զբաղված» է կամ օգտագործվում է այդ միությունների կողմից: Ավելին բանը հասել է նրան, որ պայքարը գերտերությունների միջև ծավալվել է երկրագնդի բևեռների համար: Օրինակ Հյուսիսային բևեռի տնտեսական ներուժը գնահատվում է ավելի քան 30 տրիլիոն ԱՄՆ դոլար: Առաջիկա տարիներին տնտեսական միությունների միջև միաձուլումների և միացումների գործընթացը ընթանալու է նոր արագությամբ: Հարավային Կովկասի տարածաշրջանում նույնպես ընթանում են տնտեսական ինտեգրման և գիտատեխնիկական առաջընթացի խորացման և համագործակցության գործընթաց, որը այս կամ այն կերպ առնչվում է տարածաշրջանի 3 (Հայաստան, Վրաստան, Ադրբեջան) երկրների, այնպես էլ նրանց միջև տեղի ունեցող տնտեսական կապերի ու փոխհարաբերությունների: Հատկապես Հայաստանի Հանրապետության և Արցախի Հանրապետության համար տնտեսական կապերի արդյունավետության բարձրացումը և դրանց հիմքում համեմատական առավելությունների տեսության կիրառումը ունի բացառիկ կենսական նշանակություն տնտեսական աճի ավելի բարձր տեմպերի ապահովման և բնակչության կենսամակարդակի նշանակալի բարձրացման համար: Նման պայմաններում էական է դառնում նաև տնտեսական գործընկերության նոր ուղղությունների մշակումը և դրանց իրականացումը, որոնք նոր հորիզոններ կբացեն Հայաստանի և Արցախի սոցալ-տնտեսական զարգացման համար:

Բանալի բառեր. համախառը ներքին արդյունք, արտաքին առևտրաշրջանառություն, արտահանում, ներմուծում, համեմատական առավելությունների գործակից, զարգացման հիմնական ուղղություններ:

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ВИДЕНИЕ ЭКОНОМИЧЕСКОГО СОТРУДНИЧЕСТВА НА ЮЖНОМ КАВКАЗЕ, В АРМЕНИИ И РЕСПУБЛИКЕ АРЦАХ

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На нынешнем этапе развития экономическое пространство мира разделено между различными экономико-политическими объединениями. Борьба за каждый квадратный метр площади настолько обострилась, что можно утверждать о том, что каждый квадратный метр "занят" или используется этими объединениями. Более того, борьба между сверхдержавами уже

ведется за господство над полюсами Земли. Например, экономический потенциал Северного полюса оценивается более чем в 30 триллионов долларов США. В ближайшие годы процесс слияний и поглощений между экономическими объединениями усилится. Регион Южного Кавказа также переживает процесс экономической интеграции и углубления научно-технического прогресса, и в этот процесс так или иначе вовлечены три страны региона (Армения, Грузия, Азербайджан) с присущими им экономическими связями и схемами взаимодействия. Увеличение эффективности экономических связей между Республикой Армения и Республикой Арцах, основанной на реализации теории сравнительных преимуществ имеет важное значение для обеспечения более высоких темпов экономического роста и значительного повышения уровня жизни населения. На первый план выходит необходимость разработки и реализации новых направлений экономического партнерства, которые расширят возможности социально-экономического развития Армении и Арцаха.

Ключевые слова: валовой внутренний продукт, внешнеторговый оборот, экспорт, импорт, коэффициент сравнительного преимущества, основные направления развития.

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MODERN PERCEPTIONS OF THE ROLE OF STATE

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The perception of the role of the state tends to constantly change which is quite natural because studies of the role of the state and its functions were not interrupted, moreover, they were important at all times and in all societies. Attempts to find the only correct model have not ended and will never end since the boundaries of confrontation and cooperation between the state and the market will never be determined. So it is the logic and philosophy of human development and progress.

Emphasizing the importance of public administration, it should be noted that, according to the community of experts, today countries compete among themselves with models of public administration - the work of institutions and not the cost of labor or the effectiveness of tax policy. And in this sense, in modern conditions, it is the work of institutions that should primarily determine the fate of public consent.

The greatest danger of state or market regulation is the situation when too many functions are concentrated in the hands of the state, or vice versa, when market regulation mechanisms become uncontrollable. In order to avoid such situations, it is necessary to provide people with equal opportunities. The important thing is not what level of inequality is established in society, but how much people have the opportunity to realize their plans and abilities to achieve the highest level in the social pyramid.

Key words: state, market, institutions, "failures" of the state and the market, public goods, competition, costs, revenues.

Introduction

Perceptions of the state are one of the most fascinating, most demanded, most studied and yet at the same time not completely clarified phenomena up to nowadays. As Douglas North noted. "The court has gonem for consultation on the issue of the state's need for economy and has not returned yet". Why is the question of the full characterization of the state not only concerning the economy but everything in general also very topical today? The problem is that for centuries, when arguing for the necessity of the state, this necessity was ascribed to facts that were not existing in real or even being existed, they were exaggerated. Because of all this the real picture has been distorted and such functions were attributed to the state that did not have any relation with it. For example, the well-known British economists - David Riccardo, James Mill, John Maynard Keynes and others set the same example when speaking in favor of the state: who would have built the lighthouses in England if not the government? And it was very important to people who did it in those times of England. But later it turned out that the reality was different and that no English government had done such things. Economist, Nobel Prize winner Ronald Coase found out as a result of his research in British Admiral Archive that no English lighthouse was built by the government in England (which he had written about in his <<Lighthouse in Economics>> or <<The role of the lighthouse in Economics>>) [1] classical works). They were built by the Guild of Ship Captains, local communities and corporations of shipowners but not by the government. Why did we decide to refer to this well-known fact? Because even today, when presenting the essence of the state, people often use myths to be far from the reality. The motives are political when, for purely political expediency, they seek to justify the seizure of power by the exploitation of "state", "state" institutions, the ineffective use of resources, corruption, restrictions on freedoms for both citizens and business. Ex-soviet countries can be considered as an example except for the Baltic states and Georgia.

The reality is that the perceptions of the state have been constantly changing since the formation of the state up to now which is very natural in relation to the periods of human development and their peculiarities. The important thing is not only to take into account these circumstances, but to

appreciate and understand the content and need of those transformations. The change in the nature of the state and state functions is linked to many factors which will be discussed below more detailed but for all times it is important to find the golden medium between State and Market. The golden medium is the most difficult and most important task that every country, state and society must solve without overestimating and underestimating. For example, when the sphere of activity of the state is unlimited (when everything is permitted in the political process), sowing hostility and theftin the society become common. People spend more time struggling to get a piece of economic "pie" than producing that pie. As a result, the volume of output decreases, the production declines and hostility, distrust and even hatred increase in society. In a highly politicized economy life is not so easy. This applies more to the Republic of Armenia taking into account the special situation we have experienced since the collapse of the USSR. In the Soviet times we knew what was **wrong** and now we are still trying to figure out what is **right.** Most of the world is looking for the right economic recipe like us. Fundamental economics shows that private property, freedom of exchange, competing markets and monetary stability are the cornerstones of economic prosperity. When the latter are available, individuals can "sow everything", productive energy will be realized and material prosperity will be created. Depending to what extent this is applicable to separate countries, this is already on the political level, i.e. it requires a political decision.

Why should the state interfere the market economy?

As it was noted above, in all countries around the world, state institutions are in the focus of attention. Constant changes in the world economy make it difficult to find answers to the key questions the state has to answer: what should be the regulatory role of the state in the economic system?, what issues should it deal with and what it should not?, what are the optimal decisions to make in this or that situation? There are numerous and sometimes contradictory and more often complementary views on the solution of the above mentioned problem which attempt to present the boundaries of the state's influence in regulating the economy on the basis of certain starting points. From this point of view, the theories of economics have undergone quite an interesting development.

It is therefore not accidental that different models of state regulation of the economy currently exist with their unique national manifestations [2]. Looking back at the history of recent past of mankind it should be noted that in the early days of formation of classical capitalism the state did not interfere with economic processes at all. The principle of non-interference by the state in entrepreneurship has been theoretically substantiated by English and French economic school. At that time the state had to influence the economy only within the framework of "natural right", that is, to ensure the privacy and appropriation of private property. These provisions were dominating until the mid-19th century and unless we take into account some exceptions to the need for state intervention by one of the founders of classical economics, economic thought of A. Smith, the economic school practically gave no place the systematic influence of the state on economic processes.

In the beginning of the 20th century the picture changed significantly. The state's involvement in all aspects of public life related to the effects of the industrial revolution and the introduction of new social responsibilities in individual countries set new demands on governments and as a result, for example, the facts on use of taxes started gradually be noted more and more. In this connection it is worth mentioning the opinion of the prominent 20th century psychologist Carl Yung on the role of the state who thought that Man no longer views the state as a pillar and wants others to think and take responsibility for the state instead of himself. The society is satisfied that they are dressed, nourished and brought up as a social unit and are entertained in accordance with mass standards. When the state assumes the execution of laws it means that the person allows the state to realize his moral responsibility [3]. What caused these perceptions, were such perceptions objective? It should be admitted that this is perceived by Yung (and not only him) as a negative phenomenon, but the reality is that every state has a tendency to increase its role and the reasons are various. Here are some of them:

1. Increasing the role of the state may be due to the challenges in the social environment, such as technical progress, demographic changes, changes of economic system and so on [4].

2. Strengthening the role of the state also depends on local political processes: changes of the views of different civil and political organizations and trade unions as well to the functions of the state can be crucial to the formation of a "strong state".

3. Increasing the role of the state can also be linked to its role in ensuring economic growth. As American economic historian F. Gerschenkron points out, countries that have adopted the way of industrialization or other large-scale technological and economic reforms much later typically have a broader public sector [5]. In this case the state acts as a locomotive of the economy directing the resources at its disposal to technical upgrading of the economy, scientific programs, growth of investment and infrastructural policy. This is the way post-war France, Germany, Japan and the former USSR have gone. These examples prove the theories of market imperfection: rapid economic growth is often easier to obtain with the help of the state than relying solely on the "invisible hand".

4. The expansion of the functions of the state may also be dictated by its internal development patterns. Like any system, the state (in the form of its institutions) is also prone to self-preservation and self-reproduction. From this point of view, the state can be seen as a unique monopoly structure whose behavior in many cases resembles that of monopoly companies in the market.

5. Along with the increasing global warming, floods, desertification of vast territories, the joint efforts of owning the resources of the world ocean and the space and the solution of global energy problems the importance of states has recently been increasing.

By the way, even in post war period the view has been still dominating according to which the state ownership would be ruling by the end of the twentieth century. Only Friedrich von Hayek and the Austrian school did not share this viewpoint. They were convinced in the opposite viewpoint which is: private ownership would prevail. And it happened so: the revolutions of the information and telecommunications spheres of the 70-80s gave new impact to private ownership which in turn caused “other eyes” to see and appreciate state regulation once again.

Further developments were accompanied by both state and market failures and attitudes towards each other changed accordingly. Today, the positions of the ideologists of both views have become more radicalized and more stable both in the scientific and the political circles as well as in the public sector. Such a situation has been the cause of the crises of the last twenty years which were mainly presented to the public as a result of market slips or so-called "market failures". In fact, the reasons of the crises of both the regional and a number of other countries in 1998 and the global financial and economic crises of 2008 were politics -driven by the short-sighted and populist policy of leading political forces of many states during that period. The same continued further on in Europe, Greece, Spain, Portugal and even Italy when governments of these countries brought their countries to insolvency through various so-called social programs opposite the logic of liberal-market economy with their state intervention for years. This may be one of the best examples of ineffective intervention in the state market.

Sometimes the notion of a liberal state also leads to a certain misunderstanding in the sense that many people consider it to be a non-operating (non-interfering) state. Of course, this is not the right viewpoint. Every state must act, i.e. must interfere. The question is how much the intervention is predictable by the individual. When the latter knows to what extent he is protected from indirect interference and in which cases he can be influenced by the state in making his decisions and whether he can freely build his plans. In any society there are always state functions that are definitely accepted by the citizens but there are also those that do not have public consent. In fact, when the state exercises direct governance in such areas (where there is no public consent), it results in the suppression of personal freedoms. In addition, when the public sector where the state implements the management of the allocation and use of funds exceeds certain extent, its activities affect the whole system. Even if the state directly controls only part of the resources, its decisions indirectly affect the entire economy. Thus, more resources a state possesses, more unpredictable its actions are and the freedom of the individual is limited.

Early in the mid 19th century F. Bastia predicted that the state gradually expanding its activities would reach to such scales that the possession of half of national income would be considered as normal, and this would not improve the standard of living of the population but many useless state institutions would be created which would make decisions instead of people.

Therefore, it is necessary to clearly limit the scope of the state's activities, otherwise the society will lose the ability of personal initiative (entrepreneurship) along with wealth, prosperity, independence and the sense of self-worth.

At the same time, it should be noted that while there is no certain approach to the functions that are significant to the state, it is more or less acceptable for everyone to present these functions in two large groups. The first involves activities aimed at protecting the individual and his property from violence, theft and robbing etc., and the second involves providing a limited number of goods to citizens; goods that are difficult for the market to produce for this or that reason.

It can be said that the protection of property rights, enforcing contracts and resolving the conflicts through the courts become the basis for non stop market activity. On the other hand, economic growth is also facilitated by the provision of public goods by the state such as roads, national security, environmental protection and other infrastructures. Although the state has a comparative advantage in providing legal institutions and infrastructure facilities, the activities of private companies are not excluded in these areas.

Let us mention about another important question the comments connected are the result of believing in another myth about the state. It concerns the so-called public goods. Can only the state provide public goods? Over the time economic restrictions on the provision of public goods disappear. For example, issues of country protection, the fact that many existing infrastructures have alternatives, education or health services and so on are no longer state monopolies. The conclusion based on the factual situation is that the restrictions on the provision and delivery of public goods are abolished and relating them only to the state remains in the past.

How is the state regulation implemented?

The economic system of each country is a specially regulated mechanism between producers and consumers of material and non-material goods. At the same time, the economic system being a decisive factor in the development of society, is expanding day by day as the list of produced goods, their variety assortments and as a result of the division of labor and specialization (developing) the economic relations and relations with consumers are constantly branching (developing). As a result, the economy is becoming increasingly dynamic. The various business regimes that emerged during the development of civilization have always been called upon to solve three major economic problems: what, how and for whom to produce?

The search for answers to these questions, in its turn, raises new and very important questions - who will produce?, who will distribute?, whom will they distribute to? and how will it finally happen? During the production, distribution, exchange and consumption of material goods people start public or economic relations with each other. Exchange relations one of the main functions of which is to connect the consumption with production, gain their specificity in the market and through market relations. The market is a system where the activities of business entities, organizations and members of the society develop connected with production and sales. Since the market represents demand (buyer) and supply (seller), therefore, they mutually determine the prices of sale goods and services, labor and securities. Meanwhile market relations become a certain form of exchange relations. The study of the content of market relations as an expression of exchange relations requires two complementary and interrelated approaches. The first is the study of needs and production, demand and supply for giving an appropriate orientation to production. The second is the study of market needs, taste and production impact on demand which allows to predict new needs and priorities. If these approaches are fully implemented, production will be fully regulated based on market relationships. It is also necessary to use the following principle- what is produced is not that can be produced, but that what will be sold. This principle reflects the content of market and market relations.

It seems that under market conditions where the market is a self-regulated and open system, the state plays no role. But in these conditions the role of the state is not only diminishing but becoming more important as state economic flexible policy is an active factor in the socio-economic progress of society. The economic policy of the state is meant to actively influence all aspects of economic life - production, exchange, distribution and consumption.

In all countries of the world, the state institute is in the centre of universal attention. Constant changes in the world economy make the answers to the key questions the state has to find: what should be the regulatory role of the state in the economic system?, what issues should it deal with and what not? what optimal decisions should it make in this or that economic situation? Recently the transition from planned system to a marketing system in number of countries has caused an economic crisis. This fact put again the importance of the role of the state in regulating the economy under suspicion. At the beginning of the 20th century it was considered that economic growth should be provided by the state- we have it above mentioned. The experience gained during that time shows the opposite: the state plays an important role in ensuring economic and social growth but it is not direct source of economic growth. The state directly controls and regulates new complex and interconnected spheres of economic activity and promotes the wellfare and standard of living of its citizens.

Economic functions of the state

Free market, despite its spontaneous nature, is a well-organized mechanism capable of resolving the socio-economic problems the society faces. However, the ideal model of economic structure for solving different problems of society envisages the use of state regulation levers which are implemented through a number of functions. The economic functions of the state are various and numerous. These functions are classified into two groups.

The first group includes: the functions of legal support of the mechanism of market operation, protection of competition, production of public goods and stabilization of macroeconomic situation.

Legal support of the mechanism of market operation

The protection of the interests of producers and consumers in the market is a major challenge for the state. It means that in order to start an economic activity these entities must be legally protected. First of all, property rights must be secured and protected. An owner who is not sure about the safety of his property cannot make full use of his financial, creative and material potential. In this sense such legislation is needed which is able to ensure the protection and development of property rights.

The state anti monoploy legislation, laws and other regulations relating to banking and other spheres of economy (protecting and regulating) are important from the legal point of view.

Protection of competition

In every civilized economic system competition is one of the means of regulating the production. In a competitive environment, the relationship between supply and demand determines the price of the product (service) and therefore the profit that the producer (service provider) should receive. The existence of a monopoly disrupts the self-regulation of the market system: sellers become fewer and the monopolies are regulating the supply themselves and hence, the price too. Monopolies cause enormous damage to society affecting the market which results in monopoly pricing which gives them super-profits. In such cases, state intervention becomes inevitable. To regulate the competition, various governing bodies are created which regulate mainly public service tariffs and follow the quality standards. The state adopts and acts anti-monopoly legislation. The state promotes and protects the competition with such activities.

The production of pubcil goods

In certain cases the market is unable to provide the production of certain "public goods". Among those products and services there are goods which relate to defense forces and law, the

activities of enforcement agencies and others. These benefits serve the interests of the total society whose marginal costs of production do not depend on the number of consumers and in many cases are not profitable or unacceptable for private businesses (eg. licensing, forensic expertise etc.) and it is favorable that the state takes this responsibility. Such functions of the state are financed at the expense of the state budget. That is why costs on defense, social needs and state bodies have high share of state budget in many countries.

Stabilization of the macroeconomic situation

From time to time the economy is subjected into macro economic fluctuations due to the influence of both internal and external factors and the major role in solving these situations is given to the state.

The second group of state functions of regulating market relations includes: functions of redistribution of income and wealth, distribution of resources to change the structure of gross domestic product and stabilization of the economy.

By implementing these functions, the state regulates the incomes of the population, provides the old, the disabled and the unemployed with benefits, and, if necessary, makes structural changes in the structure of public production and gross domestic product. The state carries out its economic functions in three main directions:

Direct control and regulation

This is the direction in which the state controls over the economy, in particular market relations and also the regulation of relations between entrepreneurs and employees. About all complex and interconnected processes of public activity are simply controlled and regulated. Such control may be set for minimum wage rates, accident insurance during production, unemployment insurance, retire pensions, maximum duration of working days and other processes.

Public consumption

Along with the development of the society the consumption of gross domestic product is also increasing. Major part of the local production is bought by the state and used for public consumption.For preserving and developing the spheres of education, health and others the state purchases necessary property, equipment, technologies and uses to satisfy the needs of the society. The state also buys armament for defence of the country such as military technique, weapons and other types of armament.

State entrepreneurship

The state directly manages state-owned shares or wholly state-owned enterprises. State regulation should be carried out within certain limits which are determined by the flaws of a particular market and based on the current economic situation.State regulation allows for the elimination (balancing) of "failures" which the market mechanism cannot eliminate.

The study of the governing practices of countries with mixed economies shows that in these countries the government carries out such important functions as public costs, monetary and fiscal regulation. Although the market economy mechanism mainly operates in these countries, the government regulates the imperfections of the market system and thereby enhances the efficiency of the management of the resources (natural, financial, labor, etc.) and the income from them. In highly competitive economies productive resources are distributed at market prices by exchanging commodities with money aimed at producing the most useful goods and services available. However, the market does not always provide that perfection. The market economy is also characterized by the existence of monopoly sectors, unemployment, inflation, unequal distribution of incomes, extremely unequal polarization of the income of certain groups of society and so on. The smoothing (or elimination) of such phenomena is due to the need for governments to intervene in market economy activities.

The “visible hand” of the government which operates alongside the “invisible hand” of the market serves as a countermeasure to the shortcomings of the market mechanism. The government regulates the activities of public service companies, such as telecommunications, energy and other

companies. State funds science, space exploration and scientific research. The government taxes its citizens redistributing the revenue from these taxes in favor of the poor (socially unprotected) sections of the population. Finally, the government is also taking advantage of its budgetary and credit opportunities to stimulate economic growth and regulate business activity cycles. In this regard let us consider the tools through which government intervenes in the modern economy.

It is usually assumed that the government develops (defines, dictates) the rules of the game by adopting laws and other legal acts, observing the protection of property rights, guaranteeing the immunity of property, signing of agreements and contracts. It is clear that the fulfillment of these functions of the state is aimed at promoting economic efficiency, preserving social justice and maintaining macroeconomic stability and growth. In promoting economic efficiency, governments are trying to correct shortcomings in the market mechanism such as monopolies and environmental pollution. State programs aimed at ensuring social justice through tax and benefits, redistribute income for the benefit of the poor. Macroeconomic growth and sustainability are promoted by the government through taxation, costs and monetary regulation tools that will reduce unemployment and inflation while stimulating economic growth.

Various forms of inefficiency (imperfection) of the market mechanism occur regularly in the economy. For example, a company may increase profits by raising prices in an unjustified way. Certain companies pollute the air, soil and water with production wastes. In such cases, the efficiency of production or consumption declines in the market and the government can play an important role in correcting these shortcomings. Assessing the role of the government in eliminating economic shortcomings, it should be noted that the state regulation mechanism can also be ineffective, that is, situations where state efforts (efforts) to correct market failures sometimes give rise to new problems.

Almost all countries with a market economy have experienced this form of market imperfection over the last century and the governments of those countries have had to take measures to eliminate these "market distortions". In many cases, governments regulate the prices of products (services) issued by monopoly companies or limit the profits received by monopoly companies. In addition, anti monopoly legislation prohibits companies from setting prices independently or dividing markets between monopolies, for example, recently governments in various countries have adopted tax penalties on separate automobile and technology giants in relation to the agreements and artificial rise of prices by those companies.

Since the private sector is usually ineffective in producing public goods, the state must deal with it itself. By financing the production of public goods, the government behaves as any other major buyer would do. By allocating sufficient funds for certain purposes, it generates flow of funds. After the "vote on behalf of the state", a market mechanism is put in place that directs funds to relevant companies for the production and delivery of public goods ordered and financed by the state.

Discussing the poor effectiveness of the impact of the market on the production of monopolies or public goods, we focused on market deficiencies that could be corrected by government. Now imagine that the economy operates in a perfectly specific market way without compromising on production opportunities and maintaining a balance between the production of public and private goods. Even if the market system works perfectly, it can still lead to very undesirable results in the public interest. Why? Market-based income distribution does not always meet the requirements and perceptions of fairness. An economy that operates without government intervention can lead to unacceptable differences in income and personal consumption and even severe polarization.

What is the reason that the market mechanism brings about such situations? The problem is that the level of income depends on derivative factors such as the inflation, the output of labor, the heritage and so on. For this reason, the nature of income distribution may be inconsistent with the principle of justice formed in the public consciousness.

How do economists consider the disputes on revenue equality? Economics is unable to answer questions about what part of the revenue from honest market struggles should be transferred to poor families. These questions should be answered by the authorities that are responsible and concerned about ensuring social equality in the country (elective bodies). Economists can analyze the advantages

or disadvantages of redistribution in different systems. Specialists spend little time trying to determine whether distribution mechanisms (such as taxes, benefits, compensations etc.) are good for society or not. The question is whether the system of benefits and compensations for citizens will not eliminate the desire to work and whether the money for social needs will not be used for any other purpose.

Economics cannot answer the question of what level of poverty can be considered just and acceptable. However, professionals can develop real plans to raise the income of the poor.

The government not only promotes economic efficiency and justice, it also carries out macroeconomic functions to promote economic growth and stabilization.

Conclusion

Perceptions of the role of the state tend to change constantly which is very natural, though only because studies on the role of the state and its functions have not been interrupted and have always been important at all times and in all societies. Attempts to find the so-called unique truth have not ended and will not end as to distinguish the boundaries of state and market opposition and cooperation will never be possible. That is the way of life, so is the logic of human development, progress and philosophy.

Emphasizing the importance of public administration, it should be noted that, according to some professional backgrounds, countries are starting to compete with public administration models rather than labor costs and tax policies today [6]. It is no coincidence that the well-known economist Daron Achemoglu in his famous book "Why Nations Fail" [7] highlights the role of institutions. If we briefly retell the whole book, we can do it in four words: "Institutions decide everything". There are no other explanations for development or backwardness (related to climate, geography, culture etc.). In this respect, Achemoglu's words about Armenia are interesting. “Of course, I'm not an expert of Armenia, but I can say that the problem Armenia has is not geographical, not cultural and not even geopolitical but political. The problem is to make politics more related to the demands of its citizens. So, through this political process Armenia will no longer be an oligarchy but rather a society that will provide much greater impacts for the majority of its citizens, so that it can unite the significant potential it has >> [8].

For a more complete and comprehensive understanding of the issue of governance, let us refer to the World Bank Management Report published by the World Bank every two years (see Figures 1,2,3). Figure 1 shows that the quality of governance in the Republic of Armenia for the last twenty years (from 1996 to 2016) has fallen due to an increase in corruption, a decline in democracy and a decline in political stability.

The following charts show that during the mentioned years in the three South Caucasian republics similar problems were experienced in 1996 and Armenia had more favorable positions on the level of corruption at that time. In 2016 Georgia has been a leader in overall efficiency in governance, particularly in terms of low corruption and the functioning of democratic institutions due to reforms focused mainly on the formation of new institutions.

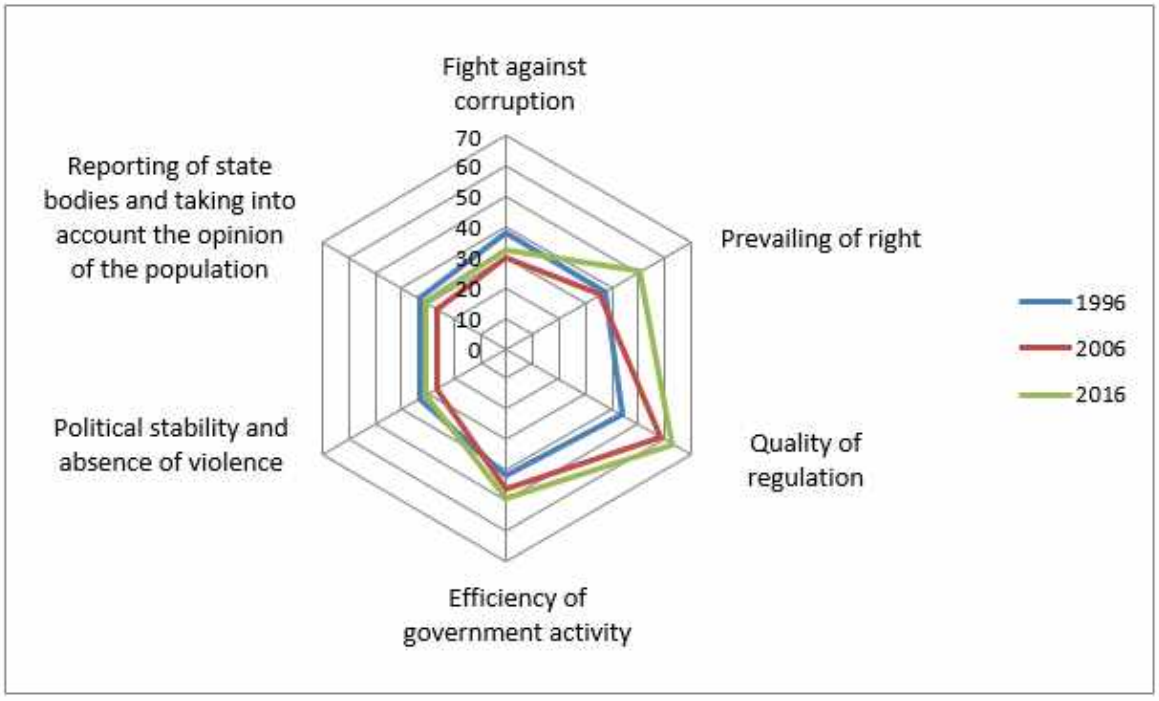
The greatest danger of state or market regulation is the situation where there is too much concentration in the hands of the state or vice versa, when market regulation mechanisms become uncontrollable.

Thus, addmitting the existence of the "invisible hand" of Adam Smith, the very issue of protecting that "invisible hand" is often neglected due to the desire for market intervention by the state. Today, the market needs more protection than ever before, with the era of new technologies providing endless possibilities to access, use and manage of information at the same time without controlling the chances the public may use for dangerous purposes - cybercrime, various illegal transactions and so on. And it is here that the state assumes the responsibility of regulating this area, which in some countries may limit the freedoms of the people related to the intentions or ideology of the ruling political force. This is one of the challenges of modern times which requires fundamentally different approaches and steps of state intervention. In this respect, the view of well-known economist Sergey Guriyev is interesting and instructive. He writes in his book <<The Myths of Economics>> [9], <<As

in the era of Adam Smith, the <<invisible hand>> of the marketplace now largely defends the interests of society. But, as before, it also needs protection. The role of the state and society lies in supporting and protecting the <<invisible hand>> from the inevitable attempts to limit its possibilities by the society>> [9].

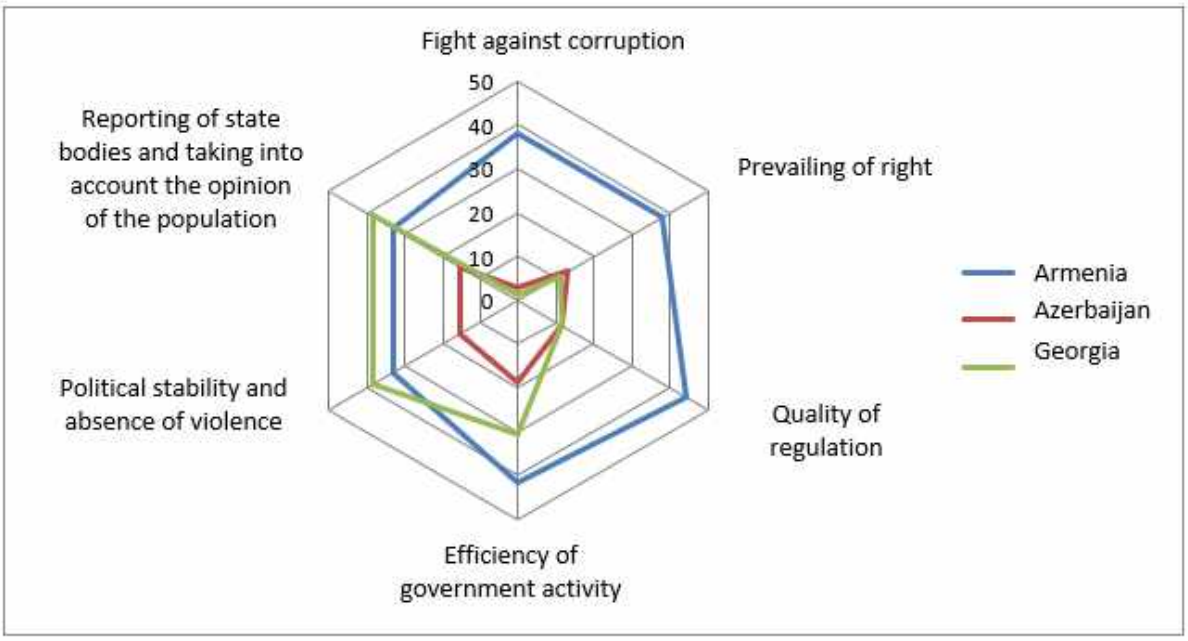
Referring to the problems of Armenia, we would like to emphasize once again that the success of the Economic Revolution in Armenia will also depend on the attitude of the state towards the state-market relations as a result of the revolution. This will be due to the volume and content of state functions. The most serious and fatal mistake of the former system was that over time the most important assumption of a market economy - the need to separate business and power - was broken. Let us remember Adam Smith who once wrote that there are two things in the world that are incompatible: **reigning** and **trading.** Instead of ensuring the strengthening of separation between business and power and their establishment which would mean equal competitive conditions, immunity for property, unselfish and equal legal system, the ideology which was adopted in Soviet times was gradually restored: that is the state has right to intervene the competitive market due to its interest or comfort and business and citizens had to obey it without discussing.

It broke the most important postulate of the market economy - ensuring the freedom of opportunity for all people and eliminating inequality of opportunity. In fact, when talking about inequality in our country and in similar countries, it is important not only to deal with income inequality but also inequality of opportunity including political mind on decisions. Mostly this is also the cause of material inequality in the future. In this respect the following idea of well-known liberal economist, Nobel Prize winner Milton Friedman is very specific: <<The important thing is not how much inequality there is in society but how much the people of the <<Bottom>> have the opportunity to reach the highest level of the social pyramid. If such dynamics are sufficiently developed, then people accept market efficiency. As opportunities are open to you, the attitude toward the issue of inequality becomes more tolerable. That is what the US social system is based on>> [10].



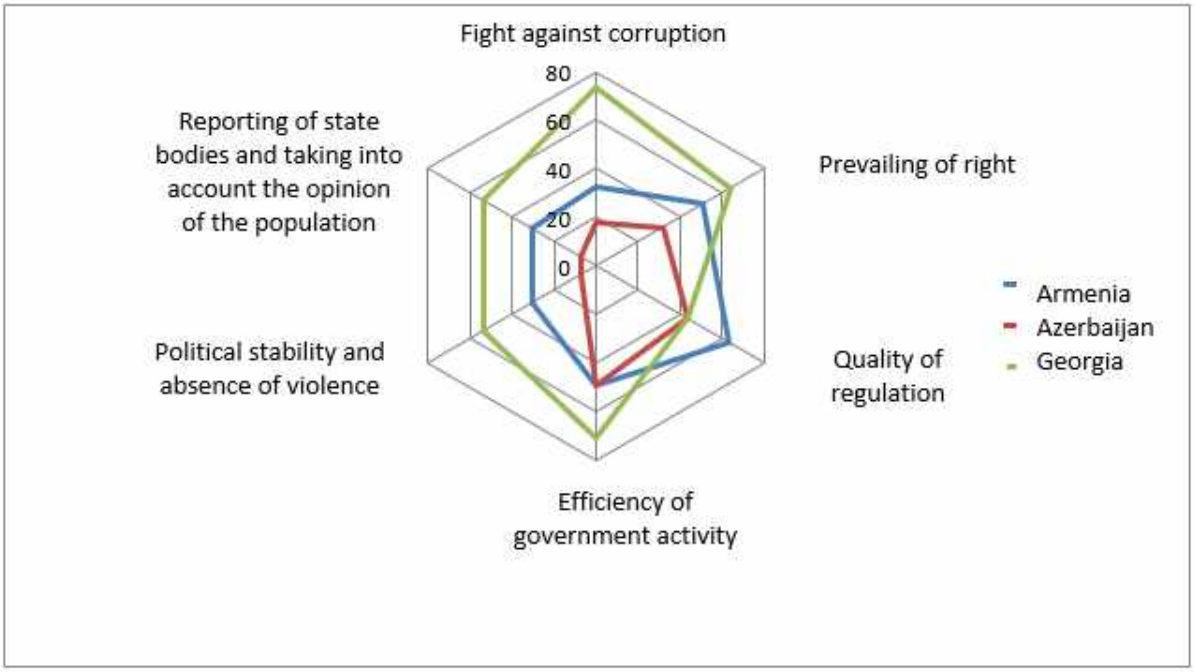
Based on the data of Worldwide Governance Indicators

Fig. 1 Change of the components of world index of public management in the Republic of Armenia in 1996-2016 [11]



Based on the data of Worldwide Governance Indicators

Fig. 2 Change of the components of world index of public management in South Caucausian countries in 1996 [11]



Based on the data of Worldwide Governance Indicators

Fig. 3 Change of the components of world index of public management in South Caucausian countries in 2016 [11]

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Վ.Գ. Խաչատուրյան
Երևանի պետական համալսարան

Պետության դերի ընկալումներն անընդհատ փոփոխությունների միտում ունեն, որը շատ բնական է, թեկուզ և միայն այն պատճառով, որ պետության դերի, նրա գործառույթների վերաբերյալ ուսումնասիրությունները չեն ընդհատվել, միշտ էլ կարևոր են եղել բոլոր ժամնակներում, բոլոր հասարակարգերում: Այսպես կոչված միակ ճշմարտությունը գտնելու փորձերը չեն ավարտվել և չեն էլ վերջանա, քանի որ պետության և շուկայի հակադրության, համագործակցության սահմանները երբևէ հնարավոր չի լինելու որոշել: Այդպես է կյանքի ընթացքը, այդպես է մարդկության զարգացման, առաջընթացի տրամաբանությունը, փիլիսոփայությունը:

Կարևորելով պետական կառավարումը, նշենք, որ ըստ մասնագիտական որոշ շրջանակների, այսօր երկրները սկսում են մրցակցել պետական կառավարման մոդելներով-ինստիտուտների աշխատանքով, և ոչ թե աշխատուժի գնով, հարկային քաղաքականությամբ: Եվ այս առումով, ժամանակակից պայմաններում ինստիտուտների աշխատանքն է առաջին հերթին պայմանավորելու պետությունների հասարակական համաձայնագրերի ճակատագիրը:

Պետության կամ շուկայի կարգավորումների ամնամեծ վտանգն այն իրավիճակն է, երբ կա շատ մեծ կենտրոնացում պետության ձեռքում կամ էլ հակառակը, երբ շուկայի կարգավորման մեխանիզմներն անվերահսկելի են դառնում: Այդպիսի իրավիճակներից խուսափելու գրավականներից առանձնացնենք մարդկանց հավասար հնարավորություններ տալու գործոնը: Կարևորն այն չէ, թե որքան է հասարակության մեջ անհավասարության չափը, այլ այն է, թե մարդիկ ինչքան հնարավորություններ ունեն իրագործելու իրենց ծրագրերը, կարողությունները սոցիալական բուրգի ամենավերին աստիճանին հասնելու համար:

Բանալի բառեր. պետություն, շուկա, ինստիտուտներ, պետության և շուկայի <<ձախողումներ>>, հասարակական բարիքներ, մրցակցություն, ծախսեր, եկամուտներ:

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СОВРЕМЕННЫЕ ВОСПРИЯТИЯ РОЛИ ГОСУДАРСТВА

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Восприятие роли государства имеет тенденцию постоянно меняться, что вполне естественно, хотя бы потому, что исследования роли государства и его функций не прерывались, более того имели важное значение во все времена и во всех обществах. Попытки найти единственно правильную модель не закончились и не закончатся никогда, так как границы противостояния и сотрудничества государства и рынка никогда не будут однозначно определены. Такова логика, философия человеческого развития, прогресса.

Подчеркивая важность государственного управления, следует отметить, что, по оценкам экспертного сообщества, сегодня страны конкурируют между собой моделями государственного управления – работой институтов, а не затратами на рабочую силу или эффективностью налоговой политики. И в этом смысле в современных условиях именно работа институтов должна в первую очередь определять судьбу общественного согласия.

Наибольшую опасность для государственного или рыночного регулирования представляет собой ситуация, когда в руках государства сконцентрировано слишком много функций или наоборот, когда механизмы рыночного регулирования становятся неуправляемыми. Во избежание таких ситуаций необходимо предоставить людям равные возможности. Важно не то, какой уровень неравенства установился в обществе, а то, насколько люди имеют возможность реализовать свои планы и способности для достижения самого высокого уровня в социальной пирамиде.

Ключевые слова: государство, рынок, институты, «провалы» государства и рынка, общественные блага, конкуренция, затраты, доходы.

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ENVIRONMENTAL REGULATION AND ECONOMIC GROWTH: LIBERAL APPROACH

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The role of state regulation has become more extensive and relatively complex in most countries than it was in previous periods as a result of globalization in the modern world since environmental protection, growing environmental problems, monopoly regulation, health care, social welfare and education etc. are under state regulation. In this context the problem of environmental regulation is especially relevant both in general and in terms of ensuring sustainable economic growth. The latter depends more on the degree of application of new scientific achievements and technologies. This means that the environmental factor of economic development cannot be ignored and therefore it has become very urgent to create a model of the economy that will satisfy two opposite requirements at first glance: to ensure economic growth without damaging the environment.

We should note that there is still no universal economic model that could subdue external influences in order to fully solve the environmental problems facing humanity and requiring urgent solutions. In addition to the political will which is required from international organizations and associations, a final theoretical solution to this problem has not yet been found. However, there are approaches the practical application of which can be an effective way to solve the problems under study. The paper gives clear proposals on the application of economic approaches to solve such problems.

Keywords: environment, external and negative factors, economic growth, marginal expenses, marginal benefits.

Introduction

Former economic development in the Republic of Armenia was unstable and created serious problems in the country among other issues such as high poverty and unemployment, monopoly and non-competitive economy and caused great damage to the environment. Due to imperfect institutional, administrative and constructive mechanisms over the years, the natural resources of the country including food products were not used effectively, air, water and soil were contaminated, waste disposal and removal issues were not solved properly. Environmental pollution, inefficient use of resources are among the key factors affecting the future sustainability of the economy of Armenia which has no sea access, limited resources and regional hard conditions.

It is not accidental that the new government of the Republic of Armenia pays special attention to environmental issues concerning all layers of the population from the very beginning. Regarding this, the section "Environment" of the Government Program states: "The environmental management policy is aimed at complex protection of the environment and natural resources, their improvement and reasonable utilization balancing with social justice and economic efficiency. The main task of environmental management is to minimize the harmful effects on the environment as air, climate, water, soil, flora and fauna, to prevent over-exploitation and illegal use of natural resources and to ensure the implementation of preventive measures" [1].

The program also foresees the introduction of flexible mechanisms of environmental management and lever systems, the development and implementation of innovative financing mechanisms (including a mechanism for offsetting environmental commitments) together with international organizations. By presenting these program provisions more completely, we can say that the government wants to solve the issue of environmental regulation by combining them with the requirements of creating favorable conditions for economic activity. It is a complicated issue that

needs the most urgent solutions not only for our country but for all humanity. Final resolution of the issue needs costs and time and demands principles, determination and consistency from Armenia and many other countries as well [2]. We offer a mechanism for environmental regulation that will practically help to meet the requirements of governmental program.

Mechanisms for reduction and compensation of environmental loss. The humanity has entered the third millennium with the burden of the most complex economic, political, social, ethnic and global environmental issues. Current environmental issues have not had their precedent in human history according to their importance. Only the recognition of these problems and the steps to overcome them can ensure the survival of mankind.

Overall, the last two millennia of development of civilization can be described as a gradual attack. If at the beginning of our era the population of the Earth was about 100-200 million, then it was already about 450 million by 1500. However, the growth of the population has not always been constant due to epidemics, various diseases and abnormal natural-climatic changes. The humanity has reached to a certain agrarian culture only since the 15th century, it has been able to increase food production and thus maintain a relatively steady growth in the amount of the production. It was after that the humanity slowly began to accelerate its development as a result of which GDP grew per capita sharply (Fig. 1).

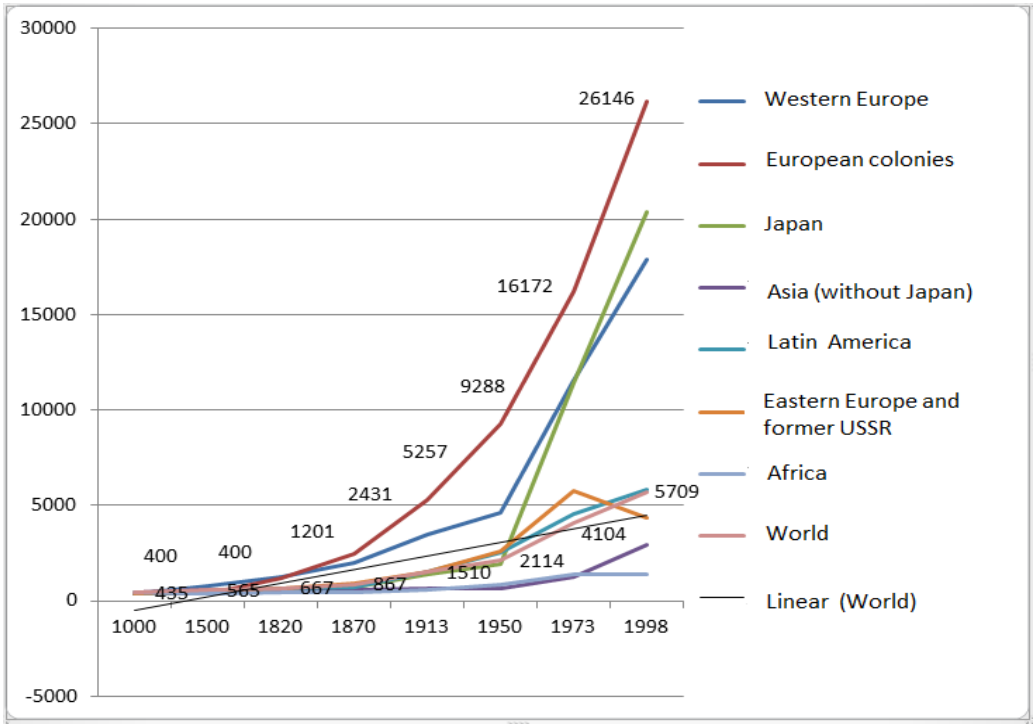

Fig. 1 The dynamics of GDP for enlarged regions of the world per capita in 1000-1998 (USD, 1990) [3]

It was also at that time that uncontrolled use of land started which caused environmental problems in its turn. And it was only in the early 20th century that the global character of human influence on the nature was evident. The beginning of the industrial revolution which is characterized by the invention of electricity, the invention of mechanical transport, the use of oil and gas gave humanity considerable energy and power. It should be noted that this period is known not only for the intense use of land, water, forest and minerals in the economic circulation that is typical of any period of societal development but also for the significant increase in anthropogenic impact on the environment. It was during this time that global environmental issues moved on to a different level which was more complex and dangerous. During the intensive development of the industry the use of resources increased for ten, one hundred and even a thousand times compared to physiological norms.

During only 100 years, the global use of energy has grown for 14 times. The total use of energy resources exceeded 400 billion tons of conventional fuel.

At the same time during the development of civilization the population growth has never reached to such a dangerous size. During the rise of one generation the population grew 2.5 times and the amount of resources needed to sustain it and the amount of waste which was returned to the environment increased with geometric progression (Fig. 2). The alert of the majority of modern scientists on the issue that humanity is endangered on earth is not accidental if the attitude towards nature is not fundamentally changed in the coming decades. Until the mid-20th century, the problem was not set so sharply as such. Some developed countries did not care about the environment for a long time during their development and prosperity. Countries with low and middle income cannot afford themselves such luxury today. It is pointless to repeat the experience of developed countries and not only justify as due to love for nature. The idea of "Now we grow, we get rich, then we will do" is simply no longer profitable.

According to the World Bank, annual losses from environmental degradation and loss of resources make up about 10% of world GDP. In China this rate is estimated at 9% of GDP and in countries like Armenia every year economic development causes environmental damage equal to 8-10% of GDP [4]. As time went on, there was a widespread misunderstanding that natural resources are unlimited and naturally it was concluded that the technical nature of economic development could not bother the humanity. Moreover, the viewpoint on conomic growth has long been axiomatic by almost all economists that it is driven by three factors: labor, capital and natural resources. New environmental problems were explained according to this viewpoint.

However, the subsequent deterioration of the ecological situation and the perception of limited resources as well as new circumstances preventing economic development have led to a reviewing of previous approaches. The growth of the economy today is largely conditioned by the rate of using the achievements of science and the application of new technologies [5]. This means that this circumstance cannot be ignored as a factor of economic development and that is why it has become extremely urgent to create a model of economy that satisfies these two requirements contradicting each other at first glance: to ensure economic growth and at the same time not to harm the environment and the surrounding nature.

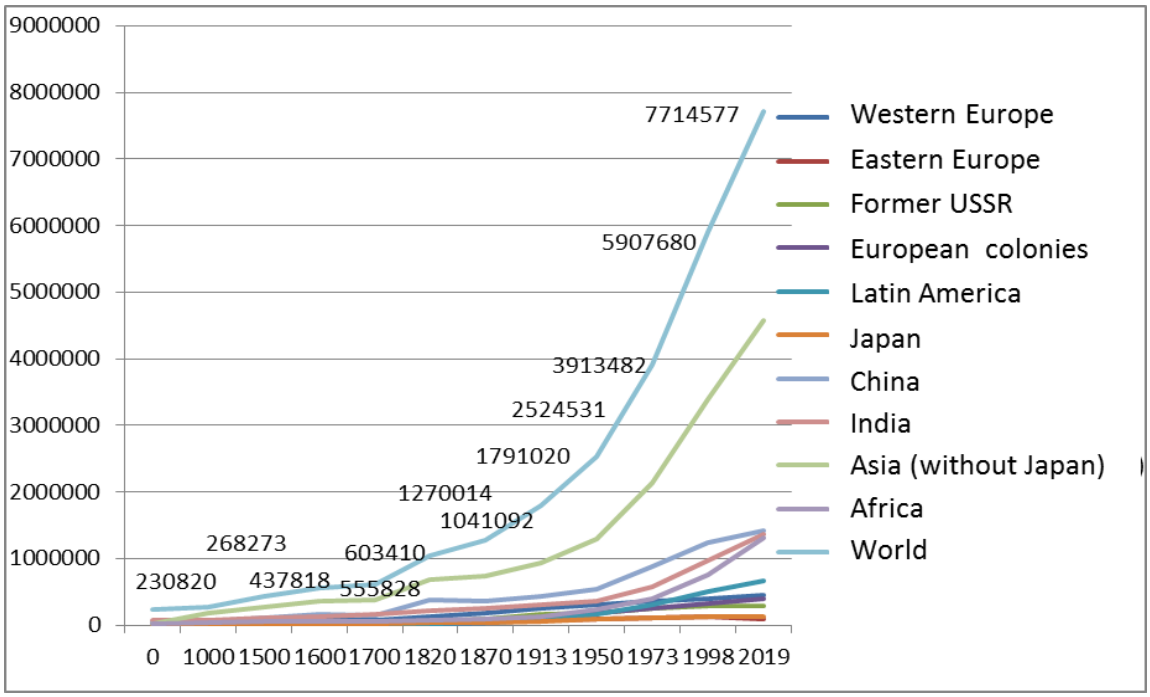

Fig. 2 World population in 0-2019 (mln. people) according to the enlarged regions of the world and separate countries [3]

The viewpoints round this issue are among the main and most important topics of theoretical and applied analyses of economics. It is natural that liberal economics could not stay aside without its own approaches. It would be ideal to find out "gold medium" but today it can be considered to be impossible.As it happens while searching for the answers to many issues, in this case the temptation is very great. i.d. the solution to save the state is to increase the regulatory role of the state.

According to Paul Heine, the individuals choose the direction of their activity thinking over the boundary revenue and boundary costs expected as a result of their activities. The costs and revenues will not affect this decision except for those costs and revenues which are significant for the business entity [6].

It is very important in understanding those numerous social issues including ecological as well. Each individual or legal entity does not take into account this cost and the economists call this external cost of activities or negative external. Its less modern nomination it is additional cost. Each person will be sad while knowing that he or she creates negative externals but will get great pleasure while knowing that he or she also creates positive externals. These are the revenues from those activities which are not taken into account by the decision maker.

You should simply accept that negative externals can not be completely disappeared. We would mainly focus on the negative externals as the issue which interests us is connected with this circumstance.

In the developed society where people are relating to thousands of people every day, the negative externals can sharply increase.

The urban population used to ignore most of the negative externals that others caused them and now they try to be careful about the unforeseen costs that they impose on others through their activities. The same refers to all sectors of the economy, i.e. negative externals arising from personal relationships also arise during the process of economic activity. It is here that the contradictions that can arise can cause frictions between citizens and different groups of society. If everyone insists on getting the right of absolutely everything they think they should have then there will always be frictions.

What must be done?

The difficult task of avoiding confrontation with society is to create laws that can avoid real injustice and minimize the costs of achieving the goal. Due to the character of the issue we deal with, we will focus on the second criterion not because it is more important but because the theory of economics can inform more about minimizing costs than about maximizing the justice.

It is a fact that many public issues which are called "pollution" can be viewed as the result of negative externals. People pollute the air or water not because they prefer to live in polluted air and water but because they are the unpredictable consequence of some of the activities they want to engage in, such as driving a car or selling goods. They don't mind the extra costs because these costs are not of great importance for them. They don't pay attention to the fact that air pollution affects thousands of other people and the pollution they create increases with the pollution created by others. However, each participant in this problem operates as if the use of driving a car outweighs the insignificant extra expense that he or she imposes on everyone in the community. The final result can be disastrous. The solution seems to be to adopt these externals through new legislation.

The definition of unanimous physical restrictions by law is a widespread approach to pollution. It is called "command and control". After a certain date no one is allowed to emit particles of more than one specified amount into the air or water basin. This approach usually does not minimize the unit of the cost of pollution. It ignores the various measures with the help of which one can usually achieve that goal so it is a weak impact to look for and invest in cheaper alternatives. Without being in too much details we also share the viewpoint that using command and control for reducing the pollution is a wrong approach.

Is there any other approach? Certainly there is.

A more economically viable approach to reduce pollution is to establish a tax rate for pollution unit. After that each polluter should be allowed to respond in the way he or she thinks is right. If we

admit that pollution is an indirect cost that the polluter does not care for, then the taxation of the activity that is the source of the pollution is very reasonable. If in some way it would have been possible to set the unit tax on pollutants equal to the cost of the additional unit cost, the costs would be carried by the creator who is likely to profit from their creation. Moreover, if the continuation of the activity which causes pollution is too costly, it will be ceased and so it should be if the costs associated with it are more than the benefit. If the income still outweighs the cost after paying taxes, the pollution-generating activity will continue but to a lesser extent as it is now more costly. But in this case the tax revenue can be used to pay compensation to those who spend extra money to win their consent.

There is a need for state intervention here which means that the state or its authorized body should be able to compare the marginal costs of the reduction of emissions with the marginal benefits. The use of taxes will enable that body to obtain information on those costs and benefits by following what happens when the costs of pollution estimated in different ways are estimated by the source of pollution. This approach enables you to learn through experiments. And getting reliable information on the costs and benefits of any program of environmental protection relevant to well-being of people has significant meaning.

Some people are against taxes on polluters because they consider such taxes to be absolutely unfair. They entirely burden the reduction of pollution on the poor precociously while the rich are allowed to directly pollute the environment. The choice of people to reduce the pollution based on minimum costs is also considered as self willed and unfair. The answer to those who raise the issue of justice is that an effective solution can be achieved no matter how the issue of justice is resolved. In other words when choosing the most effective solution, it is not necessary to expect that costs can be transferred to certain groups [7].

The reduction of pollution is very similar to any other useful activity so that its certain types are more effective than others. We win when our food, toys and perfumes are produced by those who have relative advantages in their production. We benefit in the very way when extra fresh air is produced by those who have relatively the greatest advantage. But the relative advantages are realized through exchange. That is why the tax approach of reduction of pollution is generally preferred to the one that imposes physical restrictions on certain firms. The tax approach seeks to change relative cash expenditures so that they reflect new decisions about those who are authorized. Therefore it gives the freedom of exchange on the basis of their own relative advantages to all parts in order to achieve new social objectives more effectively.

The benefits of clearing air pollution are associated with the high cost of achieving it which makes it comparable to any system that delivers more than any other at less cost. The same applies to all environmental or ecological issues. Currently the whole complex of environmental issues has great public and political appeal as people have disagreements over rights. More people say: “You get your benefits by my (or our) cost but you have no moral right to do so, so it's not a legal right”. Such disagreements are extremely difficult to resolve. In such cases, economics offers several principles to solve the problem.

The first is that the demand for any good, even clean air, is never completely elastic. People need to decide how much they want to have fresh air objectively recognizing that if they want too much, they should refuse the many other things they also want.

The second is that people need as much freedom as the way they can get their consent is chosen. For example, if the aim of the people is to reduce the burning fuel, they should be allowed to choose the measures that reduce their costs. You should avoid the “command and control” method which usually increases the cost of achieving any goal and increasing the cost also increases the resistance to achieving the goal. Price system should be used to reduce costs and allow the exchange of reduced costs.

In this respect it is worth mentioning the model of Nordhaus which had won the Nobel Prize which is widely used as it enables to model the interrelated development of economics and climate, for example, it is used to determine carbon emissions taxes [8].

Finally, the importance of sustainable property rights should always be remembered. When people know the rules of the game and can confidently rely on them and do not exchange them by chance they reduce transaction costs and increase effective collaboration.

Conclusion

Summarizing, let us point out once more that there is still no universal economic model that can completely solve urgent environmental issues set in front of the humanity by mitigating. Apart from the political will required by international organizations, states and international transnational corporations, there is still no final theoretical solution to the problem. However, there are approaches that if applied in practice, they will become the effective way of solving the problems above mentioned. Here are some of them:

- In order to solve the environmental issues, either the state must fully burden the solution of this problem or include external negative impulses in production costs, i.e. make them part of the indirect cost of the producer. The latest version of the theory of economics is known as "internationalization".

- In order to create an effective economic mechanism for protecting the environment, external economic effects (externals) must be expressed in production costs based on a legally permissible normative basis. In addition, the emphasis should be put on the principle that "those must pay who pollute the environment". The introduction of such a mechanism will make the environmental issue of the enterprise an internal problem that will force the producer to look for more efficient and economically viable methods to reduce external economic costs [9].

- It is necessary for the state to legislate the ecological boundaries of economic development. The fact that modern externals are not included in production costs shows the imperfection of such important macroeconomic indicators as GDP and GNP. These indicators do not include the loss of "biological capital". And the costs of eliminating ecological pollution and ecological crises are not counted in these macroeconomic indicators which are considered to be universal indicators of public welfare and, on the contrary, are expressed as a component of economic growth.

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[2]Երևանի պետական համալսարան

Ժամանակակից աշխարհում գլոբացման արդյունքում տնտեսությունների մեծ մասում պետական կարգավորման դերն առավել ընդլայնված և համեմատաբար բարդ է, քան նախկին ժամանակահատվածներում, քանի որ պետական կարգավորման դաշտում ներգրավված են այնպիսի ոլորտներ, ինչպիսիք են շրջակա միջավայրի պահպանությունը, բնապահպանական օրեցօր ավելացող խնդիրները, մենաշնորհների կարգավորումը, առողջապահությունը, սոցիալական ապահովությունը, կրթությունը և այլն: Այս համատեքստում հատկապես արդիական է բնապահպանական կարգավորումների խնդիրը ընդհանրապես, և մասնավորապես կապված տնտեսության հարատև աճի ապահովման պահանջի հետ: Վերջինս այսօր ավելի շատ պայմանավորված է գիտության նվաճումների և նոր տեխնոլոգիաների կիրառման աստիճանից: Սա նշանակում է, որ այդ հանգամանքը, որպես տնտեսական զարգացման գործոն, չի կարող անտեսվել և դա է պատճառը, որ խիստ հրատապ է դարձել տնտեսության այնպիսի մոդելի ստեղծումը, որը բավարարի երկու՝ առաջին հայացքից իրար հակասող, պահանջներ. ապահովել տնտեսական աճ և միաժամանակ շրջակա միջավայրին ու բնությանը վնաս չպատճառել:

Նշենք, որ դեռևս չկա տնտեսական այն ունիվերսալ մոդելը, որը կարող է մեղմացնելով արտաքին ազդեցությունները՝ էքստերնալները, ամբողջապես լուծի մարդկության առջև կանգնած և հրատապություն պահանջող բնապահպանական հիմնախնդիրները: Բացի քաղաքական կամքից, որը պահանջվում է միջազգային կազմակերպություններից, պետություններից, միջազգային վերազգային կորպորացիաներից, դեռևս չկա նաև խնդրի տեսական լուծման վերջնական ձևակերպումը: Սակայն կան մոտեցումներ, որոնք պրակտիկայում կիրառելու դեպքում արդյունավետ միջոց կդառնան վերը նշված խնդիրների լուծման համար: Հենց այդպիսի մի քանի մոտեցումների վերաբերյալ աշխատանքում կան կոնկրետ առաջարկներ:

Բանալի բառեր. Շրջակա միջավայր, արտաքին և բացասական էքստերնալներ, տնտեսական աճ, սահմանային ծախսեր, սահմանային օգուտներ:

УДК - 338.23.27:334.01

ЭКОЛОГИЧЕСКОЕ РЕГУЛИРОВАНИЕ И ЭКОНОМИЧЕСКИЙ РОСТ: ЛИБЕРАЛЬНЫЙ ПОДХОД

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В результате глобализации в современном мире роль государственного регулирования в большинстве стран стала более обширной и относительно сложной, чем в предыдущие

периоды, поскольку государственному ргулированию подлежат защита окружающей среды, растущие экологические проблемы, монопольное регулирование, здравоохранение, социальное обеспечение. образование и др. В этом контексте проблема экологического регулирования как в общем смысле, так и с точки зрения обеспечения устойчивого экономического роста, является особенно актуальной. Последняя задача больше зависит от степени применения новых научных достижений и технологий. Это означает, что экологический фактор экономического развития нельзя игнорировать, и поэтому крайне необходимо создать модель экономики, которая будет удовлетворять двум, на первый взгляд, противоположным требованиям: обеспечению экономического роста без нанесения вреда окружающей среде.

Отметим, что до сих пор не существует универсальной экономической модели, которая могла бы смягчить внешние воздействия, для полного решения экологических проблем, стоящих перед человечеством и требующих безотлагательного решения. Помимо политической воли, на которой настаивают международные организации и объединения, до сих пор не найдено окончательное теоретическое решение данной проблемы. Однако существуют подходы, применение которых на практике может стать эффективным способом решения исследуемых проблем. В работе даны конкретные предложения о применении экономичеких подходов к решению таких проблем.

Ключевые слова: Окружающая среда, внешние и отрицательные факторы, экономический рост, предельные расходы, предельные выгоды.

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THE ESTIMATION OF THE ACCURACY OF DEFINING THE ULTIMATE HORIZONTAL ACCELERATION OF THE GROUND OF THE BASE OF SHUSHI REALEE COLLEGE

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The results of engineering-geological and engineering-seismometric studies of the grounds of the base of the building of Shushi Realee college are presented here and the discrepancy between the obtained values of the ultimate horizontal acceleration of the ground is estimated.

It was revealed that the seismic properties of the ground of the territory of Realee College determined by the engineering-geological analogy, belong to the II (second) category with the calculated seismicity of the ultimate horizontal acceleration A_{max} = 0.3g.

Using the engineering-seismometric method, the amplitude-frequency Fourier spectrum was analyzed and it was found that the micro- fluctuations of the ground of the studied area are in the range of 3.0-3.5 Hz. and the magnitude of the period prevailing fluctuations is T_0 = 0.28-0.3 sec. which is typical for grounds with seismic properties I (first) category with the calculated seismicity of the ultimate horizontal acceleration A_{max} = 0.24g.

So, the discrepancy between the ultimate horizontal acceleration of grounds determined by the methods above mentioned is about 20%.

In order to reduce the seismic risks of buildings and structures under construction, we suggest to amend the regulatory documents for earthquake-resistant construction taking into account the possible deviations of the ultimate horizontal acceleration of grounds determined by various methods of survey.

Key words: ground, deformation, seismicity, micro zoning, horizontal acceleration micro fluctuation, period, range, frequency, spectrum.

Introduction

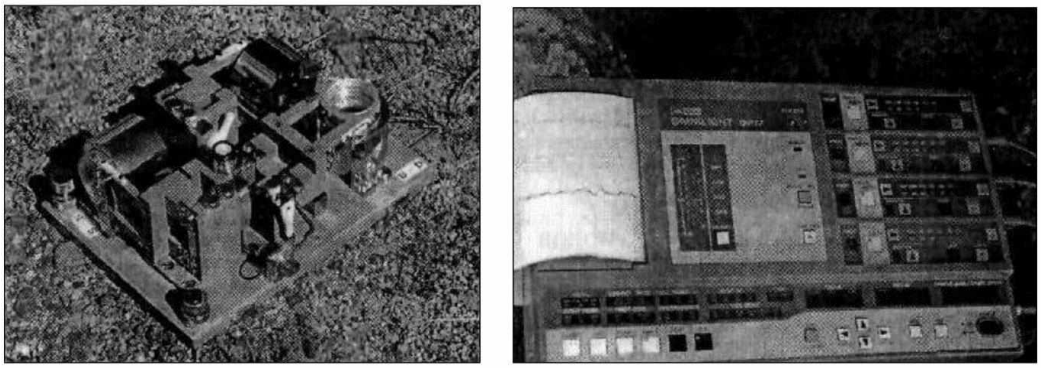
The building of Realee college in Shushi, being included in the list of historical and architectural monuments of Artsakh, was built in the beginning of the 20th century and currently is partially ruined (Fig. 1).

Connected with it the Ministries of Civil Engineering of Armenia and Artsakh announced tender for the restoration and strengthening of the building taking into account regulatory requirements and other published works on earthquake-resistant construction [3, 4, 5].

In order to determine the maximum horizontal acceleration of the ground of the base of the building of Realee college, the methods of engineering-geological analogy and engineering seismometry were used by applying a Japanese OMNILIGHT-8M measuring and computational complex consisting of a highly sensitive three-component velisograph of the model UP-255 which registers the elastic fluctuations of surface grounds (Fig. 2a) and four - channeled magnetic registering instrument FC-14 for frequency analysis of micro fluctuations (Fig. 2b).

Fig. 1 The building of Shushi Realee College, 2019

As a result of the research, discrepancies in the dimensions of the maximum horizontal acceleration of the ground of the base of the building of about 20% were revealed. Similar deviations were observed during engineering and survey work in other areas of Artsakh Republic.



a b

Fig. 2 Measuring and computational complex OMNILIGHT-8M

a) three component highly sensitive velisograph UP-255

b) four – channeled registering instrument FC-14

Topicality

Improving the accuracy of seismic calculations of buildings and structures being built and strengthened based on the improvement of the results obtained from the maximum horizontal acceleration of the ground of the basement.

Scientific novelty

The evaluation of the variation in the deviations of the maximum horizontal accelerations of grounds is given which is identified by the methods of geotechnical analogy and engineering seismometry which allow us to offer on the regulation of these deviations in normative documents on earthquake-resistant construction.

Aim of the research

Reducing seismic risks of buildings and structures taking into account amendments to existing regulatory documents on earthquake-resistant construction.

Research results

While defining the estimated seismicity (A_{max}) of the territory of Realee college as an initial seismicity (a_{max}) the dimension of horizontal acceleration of the ground was carried according to the map of detailed seismic zoning of the Republic of Artsakh where the territory of Realee college enters into the second zone with the dimension of $a_{max} = 0.3g$ (Fig. 3).

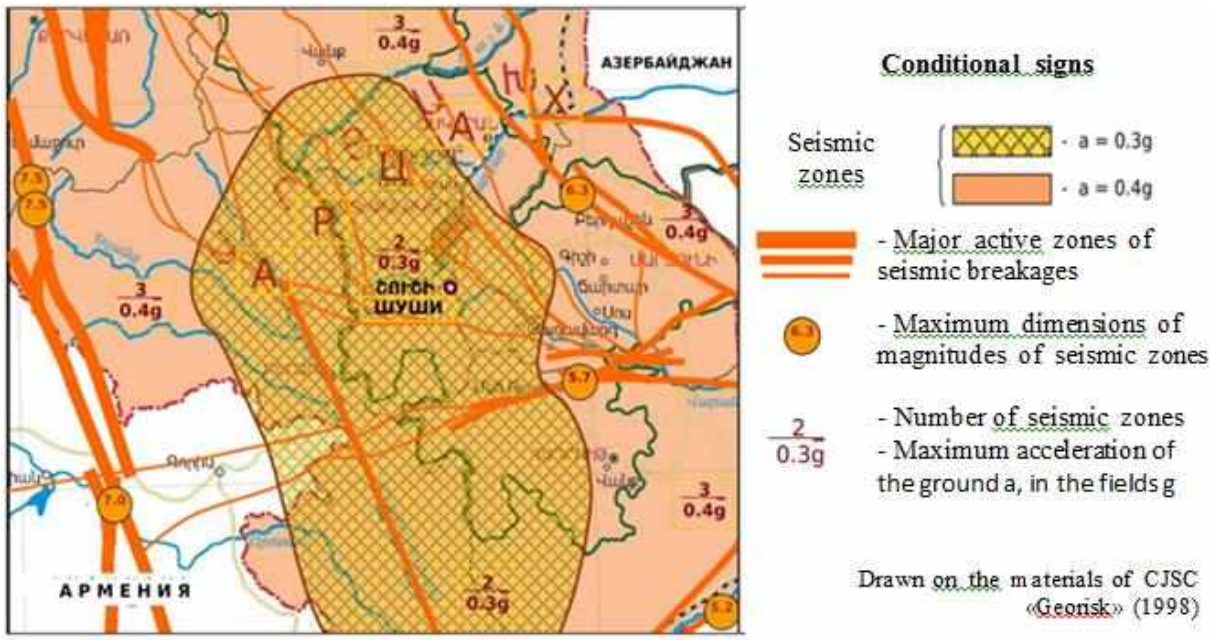


Fig. 3 Map of the detailed seismic zoning of the territory of the Republic of Artsakh (part)

The basis for seismic micro-zoning was the results of engineering-geological surveys conducted on the territory of the school according to the method of engineering-geological analogies the indicators of which are given in Table 1.

According to these data, the grounds of the basement of the school building according to seismic properties in accordance with the recommendations of CNRA II-6.02-2006 includes: layers № 1, 2, 3 and 4 (clay, loam and crushed stone) - to II (second) category, and layer № 5 (limestone) - to I (first) category when the calculated seismicity in terms of the maximum horizontal soil acceleration is A_{max} = 0.3g [5].

Table 1

Physical –mechanical properties of the ground of the territory of Shushi Realee college

№ layer	Name of the grounds	Power of the layer h m	Density of the ground грунта, ρ h/cm^3	Coefficient of porosity e	Indicator of consistency, I_L	Module of deformation, E	Module of elasticity E_0 MPs	Limit of compressive durability R_c MPs	Angle of inner friction φ Degree	Specific cohesion,, s kPs
1	Clay	3.0-4.0	1.89	0.82	>0.5	12	-	-	16	48
2	Loam	2.0-4.0	1.82	0.83	>0.5	8	-	-	15	15
3	Loam with crushed stone	2.0-2.2	1.86	0.79	>0.5	10	-	-	17	16
4	Crushed stone	0.9-1.0	2.10	-	-	35	-	-	33	6
5	Limestone	> 30	2.30	-	-	-	40	28	41	73

The obtained dimension of ultimate horizontal accelaration of the ground was also checked by the engineering seismometric method. The characteristic record of micro fluctuations of the ground of Realee college and amplitude-frequancy Fourier spectrum corresponding to them are shown in the Fig. 4 and 5.

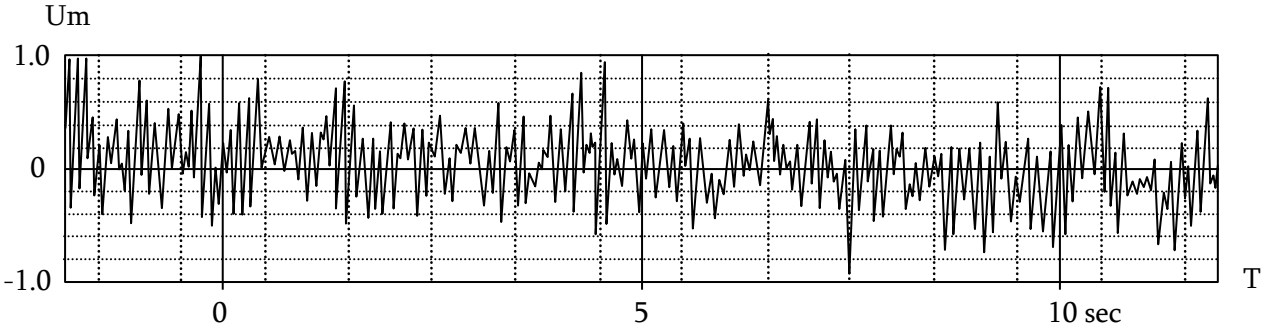


Fig. 4 Record of micro fluctuations of the ground in times
Um – amplitude of fluctuations in micro zones
T – period of fluctuations by seconds

The analysis of amplitude frequency Fourier spectrum showed that the frequency of micro fluctuations of the grounds (f) of the basement of Realee college is between 3.0-3.5 Hz when the dominating period of ground fluctuations (T_O) comprises 0.28-0.30 seconds which characterizes the seismic properties of the ground of the I (first) category with A_{max} = 0.24g with certain accuracy.

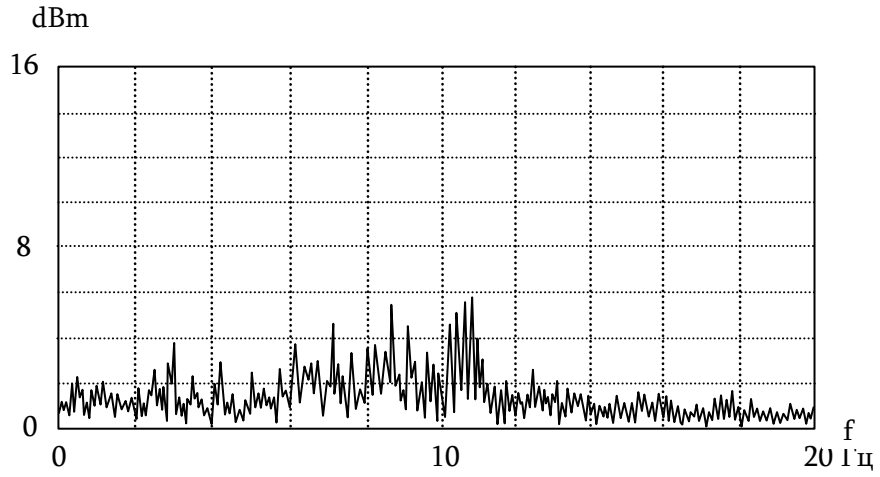


Fig. 5 Amplitude –frequency Fourier spectrum of micro fluctuations of the ground
dBm – amplitude of the fluctuations in decibels
f – frequency of fluctuations in Hertz

Thus, there are discrepancies of the order of 20% between the maximum horizontal acceleration of the foundations of Shushi Realee college building defined by the methods of geotechnical analogies (A_{max}=0.3g) and engineering seismometry (A_{max}=0.24g).

Conclusion

1. The boundaries of deviations of horizontal accelerations of grounds from the basement of the foundation of Shushi Realee college defined by the methods of geotechnical analogy and engineering seismometry are established here.
2. The results of similar analogous studies carried out in the future can serve as the basis for

increasing the accuracy of seismic calculations of buildings and structures being constructed and for amending in regulatory documents according to earthquake-resistant construction.

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ՈւՏԴ – 692.115:624.15

ՇՈՒՇԻԻ ՌԵԱԼԱԿԱՆ ՈՒՍՈՒՄՆԱՐԱՆԻ ՇԵՆՔԻ ՀԻՄՆԱՏԱԿԻ ԳՐՈՒՆՏԻ ԱՌԱՎԵԼԱԳՈՒՅՆ ՀՈՐԻԶՈՆԱԿԱՆ ԱՐԱԳԱՑՄԱՆ ՈՐՈՇՄԱՆ ՃՇՏՈՒԹՅԱՆ ԳՆԱՀԱՏՈՒՄԸ

Ֆ.Ա.Դալլաքյան, Ռ.Գ.Իսրայելյան
Շուշիի տեխնոլոգիական համալսարան

Ներկայացվող աշխատանքում դիտարկվում են Շուշիի Ռեալական ուսումնարանի շենքի հիմնատակի գրունտների ինժեներաերկրաբանական և ինժեներասեյսմամետրական

հետազոտությունների արդյունքները: Տրված է գրունտի առավելագույն հորիզոնական արագացման մեծության շեղման գնահատականը:

Բացահայտված է, որ ինժեներաերկրաբանական նմանակման մեթոդի կիրառմամբ Ռեալական ուսումնարանի տարածքի գրունտներն ըստ սեյսմիկ հատկության վերաբերում են II (երկրորդ) կարգին՝ A_{max} = 0.3g առավելագույն հորիզոնական արագացմաբ:

Ինժեներասեյսմամետրական մեթոդի կիրառման դեպքում կատարվել է Ֆուրյեի ամպլիտուդա-հաճախականային սպեկտրի վերլուծություն, ըստ որի հաստատվել է, որ ուսումնասիրվող տարածքի միկրոտատանումները գտնվում են 3.0-3.5 հերցի սահմաններում, որի դեպքում գերակշռող պարբերությունը գտնվում է T_0 = 0.28-0.3 վրկ տիրույթում, ինչն ըստ սեյսմիկ հատկության բնորոշ է I (առաջին) կարգի գրունտներին՝ A_{max} = 0.24g առավելագույն հորիզոնական արագացմաբ: Այսպիսով, վերոնշյալ մեթոդներով բացահայտված գրունտների առավելագույն հորիզոնական արագացումների միջև շեղումը կազմում է մոտ 20%:

Առաջարկվում է կառուցվող շենքերի և շինությունների սեյսմիկ ռիսկի նվազեցման նպատակով տարբեր մեթոդներով որոշված գրունտների առավելագույն հորիզոնական արագացման մեծությունների հնարավոր շեղումների հաշվառմամբ սեյսմակայուն շինարարության գործող նորմատիվային փաստաթղթերում մտցնել փոփոխություն:

Բանալի բառեր. գրունտ, դեֆորմացում, սեյսմիկություն, միկրոշրջանացում, հորիզոնական արագացում, միկրոտատանում, պարբերություն, ամպլիտուդ, հաճախականություն, սպեկտր:

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ОЦЕНКА ТОЧНОСТИ ОПРЕДЕЛЕНИЯ МАКСИМАЛЬНОГО ГОРИЗОНТАЛЬНОГО УСКОРЕНИЯ ГРУНТА ОСНОВАНИЯ ЗДАНИЯ РЕАЛЬНОГО УЧИЛИЩА г. ШУШИ

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Приводятся результаты инженерно-геологических и инженерно- сейсмометрических исследований грунтов основания здания Реального училища г. Шуши и дана оценка расхождения полученных величин максимального горизонтального ускорения грунтов.

Выявлено, что сейсмические свойства грунтов территории Реального училища, определенные методом инженерно-геологической аналогии, относятся к II (второй) категории с расчетной сейсмичностью максимального горизонтального ускорения A_{max} = 0.3g.

При инженерно-сейсмометрическом методе выполнен анализ амплитудно-частотного спектра Фурье и установлено, что микроколебания грунтов исследуемой территории находятся в пределах 3.0-3.5 Гц., а величина преобладающего периода колебаний составляет T_0 = 0.28-0.3 сек., что характерно для грунтов с сейсмическими свойствами I (первой) категории с расчетной сейсмичностью максимального горизонтального ускорения A_{max} = 0.24g.

Таким образом, расхождение величин максимального горизонтального ускорения грунтов, определенных указанными выше методами, составляет порядка 20%.

С целью снижения сейсмических рисков возводимых зданий и сооружений предлагается внести изменения в нормативные документы по сейсмостойкому строительству, учитывающие

возможные отклонения величин максимального горизонтального ускорения грунтов, определенного различными методами изысканий.

Ключевые слова: грунт, деформация, сейсмичность, микрорайонирование, горизонтальное ускорение, микроколебание, период, амплитуда, частота, спектр.

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DADIVANK AS AN EXAMPLE OF FORMATION AND DEVELOPMENT OF ARTSAKH SCHOOL OF ARCHITECTURE

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Over 1600 historical and architectural monuments have reached our times from different ancient times on the territory of Nagorno Karabakh. There were certain conditions and pre-Christian engineering traditions in the region that were manifested in the early Middle Ages and later in architecture and urban development especially in construction art and construction techniques. The result is a large number of highly designed and multi-faceted structures that were instrumental in the design and development of the Artsakh School of Architecture in the Middle Ages. The number of these structures had reached several thousands from which only a small number has been preserved. In the XII-XIII centuries the art of construction flourished when the Artsakh School of Armenian Architecture was formed with its monastic complexes the brilliant example of which is Dadivank (Khutavank).

Dadivank Complex is one of the largest architectural monuments in Armenia distinguished by its typical diversity of structures which is particularly characteristic to secular buildings. It is associated with its artistic and structural features and is in close unity with pan-Armenian architecture and has much in common. It is one of the best works of Artsakh School of Architecture, an expression of high development and mastery of the Armenian art of construction. Dadivank Hall is "a unique monument to the secular architecture of medieval Armenia. Dadivank dining room is unique with its organically connected kitchen and preserved composition".

Key words: Nagorno Karabakh, historical-architectural, monuments, Middle Ages, structures, school of architecture, Artsakh, various, civil engineering.

Introduction

Dadivank is a medieval monastery complex situated in Khachen province of Artsakh on the left bank of River Tartar. Historically it was the spiritual centre of the province «Mets Kvenq». It had also been called Khutavank being built on a hill. It had been a very important spiritual and cultural centre.

According to the tradition, it had been constructed in the first century on the site of Dady who had been massacred for Christian propaganda. It is mentioned in the 5th century as residence of Christian Bishops. The Seljuks invaded and destroyed it in the 12th century but it had been reconstructed since the second half of the 12th century to the 13th century.

Conflict settings

The purpose is to observe the process of formation and development of the historical-architectural structures of Artsakh. The aim of the article is to reveal the process of formation of architectural design in the XII-XIII centuries at Artsakh School of Architecture in the example of Dadivank Monastery Complex.

Research results

The monastery complex has a unique grouping and site depending on the location. The design of Dadivank monastery with its numerous monuments and relief conditions has a mixed solution: main group is regular and southwest is with free layout. It is divided into three functional groups: worship site (churches, vestibules, bell tower), secular (hall, dining room, kitchen, library) and housing-economic site (guest-house) which are situated in parallel with each other enriching the approaches of forming the main layouts of complexes of Armenian typical monastery (free layout, angular layout, rectangular-centered etc.). Main Church which is called Cathedral, was built by the wife of Prince Vakhtang, Arzukhatun in 1214 AD. It is a building of outwardly rectangular, inwardly cross-shaped

with a four-cornered dome. It is the same type as Gandzasar monastery but with more concentrated proportions. Having a square symmetry, the difference between the depths of the longitudinal and transverse wings is not large, so the inner cross is not very perceptible which gives the church the structure of central dome. The monasteries of Dadivank and Gandzasar are not only identical in layout and scale but also in the development of facades also taking into account their being built together. M. Hasratyan considers it possible that the architects or builders of these two prominent structures were the same people [13, page 45].

The cross wings are layered with triangular cut nodes decorated with five-sided decorative arches. On both sides of the south façade the sons of Hasan and Grigoris of Arzukhatun are standing with their full height and a sculpture of the church is sculpted above. All of this is in close association with the close engraving of the arch, window and in lower part with the engraving on the huge surface of the wall making it the best example of a combination of arts. One of the unique examples is that the titular princes are depicted with halos. The sculptures have a lot in common with titular sculptures of Sanahin, Haghpat and especially Harich. Like many Armenian miniatures, Dadivank miniatures also closely resemble the architectural imaginary forms of the cathedral. Behind the dome of the miniature a round window is open. Through the window the icon is also visible from the inside.

The eastern facade sculpture is also in close resemblance with the general facade composition. It depicts the monastery patron Dady and the prince Vakhtang not in height as in the southern front but only in the upper part of the body. Both of titular sculptures are noted by their originality, high art and history. The most important component of the exterior decoration of the church are the porches. Northern porch is distinguished by its magnificent composition: rectangular inlet opening (currently closed) is edged with a three-column beam which is a very prominent style with perspective regulated enclosure in the 13th century Armenian architecture embedded in a rectangular frame with rich ornaments and rosettes. The western porch also has rich ornamentation similar to that of the northern one on which the master sculptor's autobiography was curved saying "Remember me as Saint Paul's Painter" [13, page 47].

The palette of colours plays an important place in the artistic literary expression of Dadivank cathedral made with felsites stones of different colors and shades making the common gray surface of the walls vivid.

To the west there is a rectangular staircase with an arched vestibule and an elongated column hall to the south (XIII century). On the west wall of the lobby a two-storey bell tower with a four-column spire is located (1333). On the north side there is a prominent church of St. Daddy (X-XI centuries) to the west of which is a four-storey centralized vestibule built by Bishop Gregory (1224). Daddy church, besides the unusual width of the halls, is also characterized by its location of the deposition between the semicircular altar of the stage and the outer rectangular walls in solid volumes. Being the most common type of vestibule in its composition, it differs substantially in its proportions from similar ones, which, even if being square or nearly square in their outlay, has an unusually wide elongation in Dadivank: the width is 1,5 times more than its length. It was precisely this transverse elongation that led to the solution of the roof of the courtyard in contrast to the accepted solutions. Dadivank vestibule roof has a south-north double slope roof in the center of which an octagonal dome with trompe transmission rises. The courtyard has no other source of light besides the huddle.

To the south of the cathedral there is a church with a pair of domed chamber arches (XIII c.). The first row of the round dome is made of curved stone, the entire dome is made of brick and the upper row is again made of brick. Another feature is that the dome is not cylindrical but it narrows upwards like a cut cone. In the center of the southern monument complex there is a four-storey vestibule which is like four column centralized hall (1211) with an arched dining room with a kitchen of east-square layout and a dome with an arch to the west.

M. Hasratyan notes that Dadivank hall is "a unique monument to the secular architecture of medieval Armenia" [1, page 45].

Monastic tables of Dadivank of XII-XIII centuries are of two types in their composition: the first type consists of tables with centralized cross columns (Haghpat, Haghartsin), the second type

consists with prolonged dining rooms and orchard halls leaned over the arches (Kobayr, Kirants, Tegheniats). The dining room of Dadivank is also devoted to this type which is unique with its organically tied and well kept kitchen. The arches of the corner portions of the auditorium are resting on the pillars in the middle of the walls holding the pyramidal chimney roof.

Dadivank monastery complex is one of the largest architectural monumental group in Armenia distinguished by its typological diversity of structures particularly characteristic of secular buildings. It is associated with pan-Armenian architecture by its artistic and structural features. It is one of the best masterpieces of Artsakh School of Architecture, an expression of high development and mastery of the Armenian art of construction.

Palace hall, guesthouse, library and dining room of Dadivank monastery complex are examples of secular architecture with their unique and high-art solutions.

Tourism has always been interesting in Nagorno-Karabakh with its fascinating and picturesque culturally rich historical sites all over the world. Many of them have become open air museums and tourism centers including Dadivank Monastery Complex.

For many tourists, Dadivank is not only a medieval religious and cultural monument, it has also become a sanctuary that has been preserved for centuries and inherited from generation to generation.

High quality information should be provided in conservation practices and tourism programs so that the visitor can understand the importance of the heritage and the need to protect it. These programs should also contribute to better visits by tourists all over the world.

There is no need for national or ethnographic “imitation” in Armenia which has recently become very common all over the world. Armenian architecture, being interested from the point of view of museums or historical tourism, is itself sufficient [2].

Dadivank is a shining example of all above mentioned where there is a variety of quality and quantity that makes no sense for all “imitation” projects.

Conclusion

Armenian apostolic medieval Dadivank monastery (Khutavank) complex had its impact on the formation and development of the Artsakh school of architecture.

The monastery complex has a unique grouping and location over the site.

The design of Dadivank outlay is dictated by numerous monuments and relief conditions. The variety of colours plays an important place in the artistic expression of Dadivank cathedral made of felsites stones of different colors and shades making the common gray surface of the walls vivid and attractive.

Palace hall, guesthouse, library and dining room of Dadivank monastery complex are examples of secular architecture with their unique and high-art solutions.

Dadivank monastery complex can serve as a center for museums and tourism. For many tourists Dadivank is a medieval cult-historical monument.

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ՈւՏԴ – 726.05:692.2.69.03

ԴԱԴԻՎԱՆՔՆ ՈՐՊԵՍ ԱՐՑԱԽԻ ԴՊՐՈՑԻ ՃԱՐՏԱՐԱՊԵՏՈՒԹՅԱՆ ՁԵՎԱՎՈՐՄԱՆ ԵՎ ԶԱՐԳԱՑՄԱՆ ՕՐԻՆԱԿ

Ն.Ա. Միքայելյան
Շուշիի տեխնոլոգիական համալսարան

Լեռնային Ղարաբաղի տարածքում տարբեր դարաշրջաններից մեր ժամանակներն են հասել ավելի քան 1600 պատմաճարտարապետական հուշարձաններ: Տարածաշրջանում եղել են որոշակի պայմաններ և նախաքրիստոնեական շինարարական ավանդույթներ, որոնք վաղ միջնադարում և հետագայում դրսևորվել են ճարտարապետության, քաղաքաշինության, հատկապես կառուցողական արվեստի, շինարարական տեխնիկայի գծով: Դրա արգասիք են մեծ թվով բարձրարվեստ, բազմաբնույթ կառույցները, որոնք կարևոր եղան զարգացած միջնադարում Արցախի ճարտարապետական դպրոցի ձևավորման և զարգացման համար: Այդ կառույցների թիվը հասել է մի քանի հազարի, որոնցից միայն փոքր քանակությամբ օրինակներ են պահպանվել:XII-XIII դարերում շինարարական արվեստը ծաղկում է ապրել, երբ ձևավորվել է հայկական ճարտարապետության Արցախի դպրոցը՝ իր վանքային համալիրներով, որի փայլուն օրինակն է հանդիսանում Դադիվանքը (Խութավանք):

Դադիվանքի համալիրը Հայաստանի խոշորագույն ճարտարապետական հուշարձանախմբերից է, աչքի է ընկնում կառույցների տիպաբանական բազմազանությամբ, ինչը հատկանշական է հատկապես աշխարհիկ շինություններին: Այն իր գեղարվեստական և կառուցվածքային հատկանիշներով, համահայկական ճարտարապետության հետ կապված է սերտ միասնությամբ և ընդհանրությամբ: Այն Արցախի ճարտարապետական դպրոցի լավագույն գործերից է, հայ շինարվեստի բարձր զարգացման և վարպետության արտահայտություն: Դադիվանքի դահլիճը «միջնադարյան Հայաստանի աշխարհիկ ճարտարապետության եզակի հուշարձան է: Դադիվանքի սեղանատունը եզակի է իր հետ օրգանապես կապված և հորինվածքը պահպանած խոհանոցով:

Բանալի բառեր. Լեռնային Ղարաբաղ, պատմաճարտարապետական, հուշարձաններ, միջնադար, կառույցներ, ճարտարապետական դպրոց, Արցախ, բազմաբնույթ, քաղաքաշինություն:

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ДАДИВАНК КАК ПРИМЕР ФОРМИРОВАНИЯ И РАЗВИТИЯ АРЦАХСКОЙ ШКОЛЫ АРХИТЕКТУРЫ

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С разных времён до наших дней дошло более 1600 историко-архитектурных памятников, сохранившихся на территории Нагорного Карабаха. В регионе были определенные условия и дохристианские строительные традиции, которые со времен раннего средневековья и в

дальнейшем проявились в архитектуре, градостроительстве, особенно в искусстве строения по части строительной техники.

Результатом этого стало большое количество высокохудожественных, разнообразных сооружений, которые были значимы в развитом средневековье для формирования и развития Арцахской школы архитектуры.

Число этих строений достигло нескольких тысяч, из которых сохранилось лишь малое количество примеров.

В XII – XIII веках был расцвет строительного искусства, когда сформировалось армянская Арцахская школа архитектуры со своими монастырскими комплексами, ярким примером которого и является Дадиванк (Хутаванк).

Ключевые слова: Нагорный Карабах, историко-архитектурные памятники, средневековые, сооружения, архитектурная школа, Арцах, многообразие, градостроительство.

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THE BRAKING TORQUE OF THE CYLINDER BRAKE MECHANISM

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The calculating method of clog break mechanism of GAZel cars with independent supports has been formed aimed at calculating the breaking torque of cylinder break mechanism. Here the regularity of the distribution of the pressure along the clog is accepted as relative to radial transfers of its external points. The equations of braking torques and normal and tangential forces influencing on them have been formed here. The graphics of changes of braking torques of clogs $M_{T1} = f(\alpha_0)$ *and* $M_{T2} = f(\alpha_0)$ *and* $\rho = f(\alpha_0)$ *of tangential force which impact on the angle of the clog and are dependent on it have been set in this article. According to the formed characteristics the tangential force increases parallel to the rise of the clog and the braking torques of the clogs significantly differ from each other which the difference of fatigue of right and left overheads is conditioned by.*

Key words: braking torque, cylinder, clog, tangential force, normal force.

Introduction

Car braking is more effective if the brake mechanism provides $P_T = G_T \cdot \varphi$ braking force where G_T is the vertical load on braking wheels of the automobile:

$$G_T = \begin{cases} G_a, when\ \alpha = 0, \\ G_a \cos\alpha, when\ \alpha > 0, \end{cases}$$

α – angle of longitudinal slope of the road
φ – adjacent coefficient

Conflict setting

The braking torque of cylinder clog braking mechanism mainly depends on its structural sizes (Fig.1). Let us determine the braking torque for separately tied clog mechanism the hydraulic brake transmitter of which brings the same P force on clogs [2]:

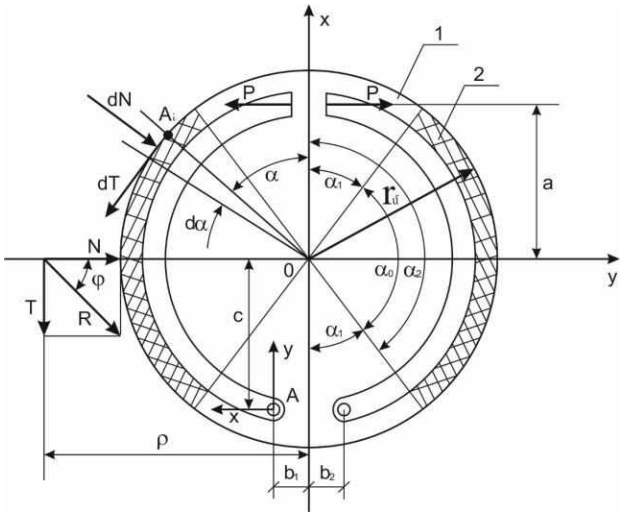

Figure 1. Clog brake mechanism with independent supports

During the brake dN normal force and dT contact force impact on the elementary surface separated by each $d\alpha$ infinite small angle of brake cylinder and brake clog. dN force can be determined by the following formula [1;3;4]

$$dN = P_o \cdot b \cdot r_\delta \cdot d\alpha, \quad (1)$$

Where P_o – is the specific pressure on the clog

b – width of braking clog

r_δ - internal radius of braking cylinder

The regularity of distribution of pressure along the clog of cylinder clog brake mechanisms is admitted as compared to the radius transportations of external points [4] according to

$$P_o = P_{max} \cdot \sin\alpha, \tag{2}$$

Where α – angle between y axis and chosen A_i clog

P_{max}– the maximum value of pressure on clog overhead

When $\alpha = \alpha_1$, dT contact force will be

$$dT = \mu \cdot dN = \mu P_o b r_\delta \, d\alpha, \tag{3}$$

Where μ – contact coefficient between brake overhead and cylinder

Respectively the elementary brake moment conditioned by dT contact force will be

$$dM_T = dT \cdot r_\delta = \mu P_o b r_\delta{}^2 d\alpha$$

The braking torque for one clog will be

$$M_{T1} = \mu b r_\delta{}^2 \int_{\alpha_1}^{\alpha_2} P_o \, d\alpha \tag{4}$$

Taking into account (2) dependence on (4) we will have

$$M_{T1} = \mu b r_\delta{}^2 \int_{\alpha_1}^{\alpha_2} P_{max} \cdot \sin\alpha \, d\alpha \tag{5}$$

From integration of (5) equation we will get

$$M_{T1} = \mu b r_\delta{}^2 P_{max} (\cos\alpha_1 - \cos\alpha_2) \tag{6}$$

The braking torque of one clog can be determined by expression (6) if the structural sizes and the regularity of distribution of normal pressure on the clog are known.

Let us determine the forces equal to N and T elementary forces when the distribution of normal pressure along the clog are equal to (2) regularity.

Taking into account that

$dx = A \cdot \mu P_o \, d\alpha$, $dy = A P_o \, d\alpha$, $A = b r_\delta$.

From the analyses of forces brought in Fig.1 we conclude

$$\begin{cases} N = A\mu \int_{\alpha_1}^{\alpha_2} P_{max} \sin\alpha \cdot \cos\alpha \cdot d\alpha + A \int_{\alpha_1}^{\alpha_2} P_{max} \sin\alpha \cdot \sin\alpha \cdot d\alpha, \\ T = A\mu \int_{\alpha_1}^{\alpha_2} P_{max} \sin\alpha \cdot \sin\alpha \cdot d\alpha + A \int_{\alpha_1}^{\alpha_2} P_{max} \sin\alpha \cdot \cos\alpha \cdot d\alpha \end{cases} \tag{7}$$

Where

$$\begin{cases} N = A\mu P_{max} \int_{\alpha_1}^{\alpha_2} \sin 2\alpha \cdot d\alpha + A P_{max} \int_{\alpha_1}^{\alpha_2} sin^2\alpha \cdot d\alpha, \\ T = A\mu P_{max} \int_{\alpha_1}^{\alpha_2} sin^2\alpha \cdot d\alpha + \frac{A P_{max}}{2} \int_{\alpha_1}^{\alpha_2} \sin 2\alpha \cdot d\alpha \end{cases} =>$$

$$\begin{cases} N = \frac{A\mu P_{max}}{2} \cdot (-\cos 2\alpha) \Big|_{\alpha_1}^{\alpha_2} + A P_{max} \left(\frac{1}{2}\alpha - \frac{1}{4} sin2\alpha\right) \Big|_{\alpha_1}^{\alpha_2} \\ T = A\mu P_{max} \left(\frac{1}{2}\alpha - \frac{1}{4}\sin 2\alpha\right) \Big|_{\alpha_1}^{\alpha_2} + \frac{A P_{max}}{2} (-cos2\alpha) \Big|_{\alpha_1}^{\alpha_2} \end{cases} =>$$

$$\begin{cases} N = \frac{A\mu P_{max}}{2} \cdot (\cos 2\alpha_1 - \cos 2\alpha_2) + AP_{max}\left(\frac{1}{2}(\alpha_2 - \alpha_1) - \frac{1}{4}(\sin 2\alpha_2 - \sin 2\alpha_1)\right), \\ T = A\mu P_{max}\left(\frac{1}{2}(\alpha_2 - \alpha_1) - \frac{1}{4}(\sin 2\alpha_2 - \sin 2\alpha_1)\right) + \frac{AP_{max}}{2} \cdot (\cos 2\alpha_1 - \cos 2\alpha_2) \end{cases} \quad (8)$$

Taking into account than in case of asymmetric clogs $\alpha_2 = 180° - \alpha_1$, we will have

$$\begin{cases} N = AP_{max}\left(\frac{1}{2}(\pi - 2\alpha_1) - \frac{1}{4}(-2\sin 2\alpha_1)\right), \\ T = A\mu P_{max}\left(\frac{1}{2}(\pi - 2\alpha_1) - \frac{1}{4}(-2\sin \alpha_1)\right): \end{cases}$$

or

$$\begin{cases} N = AP_{max}\left(\frac{1}{2}(\pi - 2\alpha_1) + \frac{1}{2}\sin \alpha_1\right), \\ T = A\mu P_{max}\left(\frac{1}{2}(\pi - 2\alpha_1) + \frac{1}{2}\sin \alpha_1\right): \end{cases} \quad (9)$$

From the obtained (9) equations the normal and tangential (contact) forces on one clog will be determined in braking regime.

Correspondingly

$$\frac{T}{N} = \mu = tg\varphi \quad (10)$$

Consequently, the slope angle of equal R force to X axis is equal to the tangential angle.

To determine the application point of T equal force (handle ρ) we will use the equations (6) and (9) according to which $M_T = T \cdot \rho$, where

$$\rho = \frac{M_T}{T}: \quad (11)$$

For asymmetric clogs we will have

$$M_T = 2 \cdot \mu b r_\delta{}^2 \cdot P_{max} \cdot \cos \alpha_1$$

Consequently,

$$\rho = \frac{\mu b r_\delta{}^2 \cdot P_{max}(\cos\alpha_1 - \cos\alpha_2)}{b r_\delta \mu P_{max}\left(\frac{1}{2}(\pi - 2\alpha_1) + \frac{1}{2}\sin\alpha_1\right)},$$

Or

$$\rho = \frac{r_\delta \cdot \cos\alpha_1 (\cos\alpha_1 - \cos\alpha_2)}{\left(\frac{1}{2}(\pi - 2\alpha_1) + \frac{1}{2}\sin\alpha_1\right)} \quad (12)$$

Where $\alpha_1 = 30°$, $r_\delta = 138mm$, $\alpha_{2i} = \alpha_1 + \alpha_{oi}$. The structural sizes are chosen from the braking mechanism of GAZel automobile.

Research results

The dimensions of the handle of tangential force (ρ) are brought in Table 1.

Table 1

α2=α0+α1, degree	α2, rad	α0, degree	cosα2	MT1	MT2	ρ, mm
40	0,698131701	10	0,7660444	7,26176	8,4337081	10,4516
50	0,872664626	20	0,6427876	16,886	19,743199	23,3364
60	1,047197551	30	0,5	29,0827	34,296291	38,2629
70	1,221730476	40	0,3420201	44,0951	52,556568	54,7775
80	1,396263402	50	0,1736482	62,1792	75,078969	72,3785
90	1,570796327	60	6,126E-17	83,5656	102,48561	90,5311
100	1,745329252	70	-0,173648	108,394	135,40161	108,684
110	1,919862177	80	-0,34202	136,605	174,31807	126,285

The graphics of dependence $\rho = f(\alpha_0)$ (Fig. 2) is given here where it is shown that parallel to rising the clog angle the handle of tangential force grows by linear regulation and the limit conditioned by the structural peculiarities of $\rho \leq 2\delta$ mechanism is confirmed.

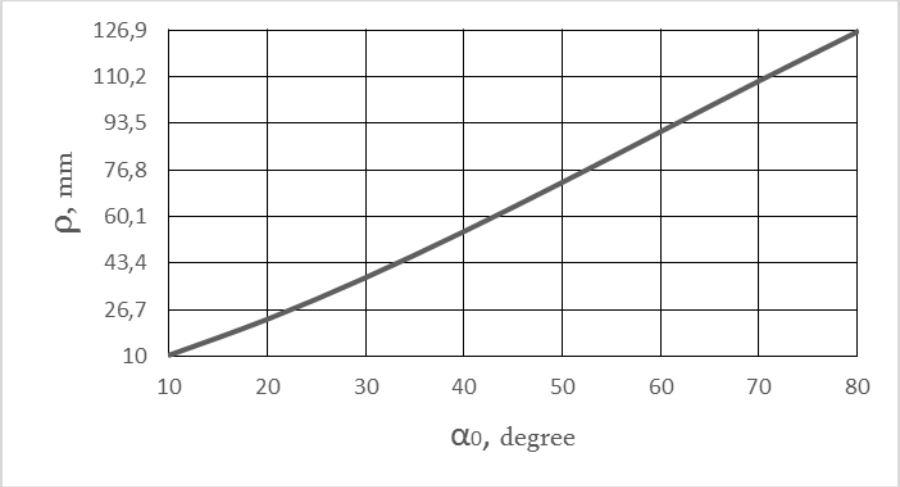

Fig. 2 $\rho = f(\alpha_0)$ – graphics of dependence

The forces impacting the braking mechanism depending on P force transmitted to the clog by the transmitter are determined by regarding the balancing condition of the clog to 0 centre of the mechanism written in the following equations

$$\begin{cases} \sum M_0 = 0, \\ \sum P_x = 0, \\ \sum P_y = 0: \\ x \cdot c + y \cdot b_1 - P \cdot a = \mu N_1 \rho, \\ N_1 = P + x, \\ T = N_1 \mu = y \end{cases} \quad (13)$$

Solving (13) equation system we will get

$$x = \frac{\mu N_1 \rho - \mu N_1 b_1 + P \cdot a}{c}, \quad (14)$$

$$M_{T1} = \mu N_1 \rho = \frac{\mu P (c+a) \rho}{c - \mu\rho + \mu b_1}, \quad (15)$$

Where $\mu = 0.35, P = 1000N, a = 115mm, c = 110mm, b_1 = 20mm, b_2 = 25mm$

We can determine the forces and torques on the second clog by the same method

$$M_{T2} = \mu N_2 \rho = \frac{\mu P (c+a) \rho}{c - \mu b_2 - \mu\rho} \quad (16)$$

The results of the calculation are brought in Table 1 according to which $M_{T1} = f(\alpha_0)$ and $M_{T2} = f(\alpha_0)$ graphics of dependence are brought (Fig.3) where we can see that the torques of clog braking are different from each other: here we should mention that the difference increases parallel to widening the angle of handle. The maximum difference $\Delta M = M_{1max} - M_{2max}$, $\Delta M = 37{,}71\ Nm$, the intensity of the fatigue of overheads of right and left clogs will be conditioned by.

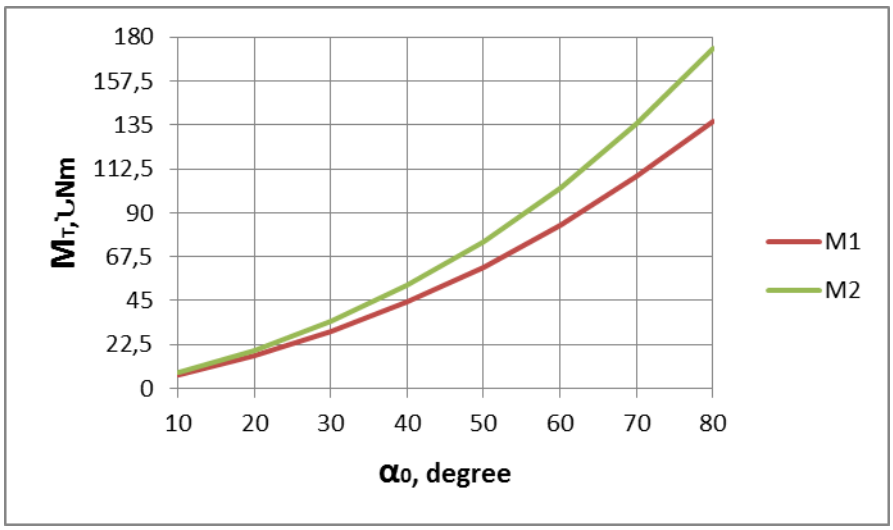

Fig. 3 $M_{T1} = f(\alpha_0)$ **and** $M_{T2} = f(\alpha_0)$ **graphics of dependence**

The summative torque of the mechanism will be

$$M_T = M_{T1} + M_{T2}$$

If we accept that $b_1 = b_2$, then we will have

$$M_T = 2\mu P\rho(c + a) \cdot \frac{c+\mu\rho}{(c+\rho\mu)^2-(\mu b)^2} \quad (17)$$

From (17) expression we conclude that in case of constant structural sizes of the mechanism the braking torque is depending on P force transmitted to the clog by transmitter and tangential coefficient. In case of certain dimensions of tangential coefficient μ self wedging may happen and it can happen in that case when the denominator of the right part of the equation (17) is equal to 0.

$$(c + \rho\mu)^2 - (\mu b)^2 = 0 \quad (18)$$

According to (18) self wedging may not happen if

$$\mu(\rho - b) < c \text{ or } \mu = \frac{c}{\rho - b}$$

According to the data we have already obtained we will get $\mu < 1$. The tangential coefficient of braking overhead and the cylinder of the mechanism comprises

$$\mu = 0{,}30 - 0{,}35$$

The results of theoretical research in the work are enough close the results of experimental research done by other authors [5].

Conclusion

In the end of our study it became clear that parallel to the widening of the angle of the clog the handle of tangential force increases by linear regulation. We can see from $M_{T1} = f(\alpha_0)$ and $M_{T2} = f(\alpha_0)$ graphics of dependence that the braking torques of the braking clogs differ from each other the intensity of the fatigue of right and left overheads is conditioned by.

The results of the studies are close enough to the experimental research results by S. V. Tyurin.

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ԹՄԲՈՒԿԱՅԻՆ ԱՐԳԵԼԱԿԱՅԻՆ ՄԵԽԱՆԻԶՄԻ ԱՐԳԵԼԱԿՄԱՆ ՄՈՄԵՆՏԸ

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Թմբուկային արգելակային մեխանիզմի արգելակման մոմենտի հաշվարկման նպատակով կազմվել է ԳԱԶել ընտանիքի ավտոմոբիլի անկախ հենարաններով կոճղակավոր արգելակային մեխանիզմի հաշվարկային սխեման: Այստեղ կոճղակի երկարությամբ ճնշման բաշխման օրինաչափությունը ընդունվում է համեմատական դրա արտաքին կետերի շառավղային տեղափոխություններին: Ստացվել են կոճղակների վրա առաջացած արգելակման մոմենտների և դրանց վրա ազդող նորմալ ու շոշափող ուժերի հավասարումները: Կառուցվել են կոճղակի անկյունից կախված և դրա վրա ազդող տանգենցյալ ուժի բազուկի $\rho = f(\alpha_0)$ ինչպես նաև կոճղակների արգելակման մոմենտների $M_{T1} = f(\alpha_0)$ և $M_{T2} = f(\alpha_0)$ փոփոխությունների գրաֆիկները: Ըստ կառուցված բնութագրերի կոճղակի աճին զուգահեռ աճում է տանգենցյալ ուժի բազուկը և կոճղակների արգելակման մոմենտները իրարից զգալի տարբերվում են, որով էլ պայմանավորվում է աջ և ձախ վերդիրների մաշի տարբերութունը:

Բանալի բառեր. արգելակային մոմենտ, թմբուկ, կոճղակ, շոշափող ուժ, նորմալ ուժ:

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ТОРМОЗНОЙ МОМЕНТ БАРАБАННОГО ТОРМОЗНОГО МЕХАНИЗМА

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С целью расчета тормозного момента барабанного тормозного механизма была составлена расчетная схема колодочного тормозного механизма с независимыми опорами автомобиля семейства ГАЗель. Здесь закономерность распределения давления по длине колодки принимается пропорционально радиальным перемещениям ее внешних точек. Получены уравнения тормозных моментов на колодках и действующих на них нормальных и касательных сил. Построены графики изменений зависимых от угла колодки и действующего на него плеча тангенциальной силы $\rho = f(\alpha_0)$, а также тормозных моментов колодок $M_{T1} = f(\alpha_0)$ и $M_{T2}=f(\alpha_0)$. В соответствии с созданными характеристиками, параллельно с увеличением угла колодки растет плечо тангенциальной силы и тормозные моменты колодок существенно отличаются друг от друга, чем и обусловливается разница между износом правых и левых накладок.

Ключевые слова: тормозной момент, барабан, колодка, касательная сила, нормальная сила.

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The article copyright Submission Format Requirements

Articles can be submitted in Armenian, English or Russian up to 14 p. (titled “Economic” up to 24 p).
Sheet format A4, margins up , down, left , right 18 mm.
The fonts: Armenian – Unicode /GHEA Grapalat/, Russian, English – Times New Roman.
The space between the lines – 1,15

1. The title of the article is given in the article’s submitted language , in capital letters, in Armenian 11, Russian and English 12 bold font size at the right bottom of the page.
2. Universal Decimal Classification consisting of 6 symbols at least is given in the left corner of the next page.
3. A line down , in the middle , the article’s submitted language , the title, capital letters, in Armenian 12, Russian and English 14 bold font size.
4. Two lines down, from the left, in the article’s submitted language, the review of the author’s name and surname, initial affiliation, in Armenian 11, Russian and English 12 bold font size
5. Aline , from the left, in the article’s submitted language, (Italic) is given the name of the organization , in Armenian 9, Russian and English 10 font size.
6. Disabling text in horizontal solid line, from the left corner of the page are given the Key Words (up to 5-8 words), in Armenian 10, Russian and English 11 font size
7. Two lines down, in the article’s submitted language, in the middle, (Italic), is written summery of the article., 10-20 lines, in Armenian 9, Russian and English 10 font size
8. Two lines down is given the main text of the article, in Armenian 10, Russian and English 11 font size.The paragraphs begin from new line, 10 mm from the depths. The expound of the theme are guaranteed of the following scheme: “Introduction”, “ conflict settings”, “Research results” , “ Conclusion”. In case of need can also be other section with corresponding titles.
9. The formulas are presented in separated lines, in the middle and are numbered on the right, in brackets. The formulas , as well as math’s symbols and expressions are given in the text in Microsoft Equation, Italic 10 font size.
10. There can be found pictures, diagrams , graphs and tables in texts. The pictures and diagrams are numbered by transit numbering by sign “pic”. The description of pictures, diagrams , the names of pictures , diagrams graphs and the signs of description are given below. They can be placed vertical or horizontal in Armenian 9,Russian and English 10 bold font. Tables are numbered by “pic” transit numbering. The names of tables , sign description are given above. They could be placed vertical or horizontal. If the table can’t be placed on a single page, it must be transferred to the other page and mentioned as condonation. In table column must not be left free lines, there must be put dash or write “ not” (“determined”).
11. Pictures , diagrams graphs in electronic version are colored as a rule.
12. At the end of the article , two lines down, from 10 mm left corner is typed “ lietarture” Armenian 11, Russian and English 12 bold font. A line down is presented the list of literature numbered by link sequence . In list the sources must be marked […] and include the authors last name and the first letter of name , full names of theme, publishing dates, (place publishing,town, year, tom and pages). Official information as well as a-mail computer programs, reports, commands, copyrights patents, in case of patents are given the whole details. The sources are given in an original languages. At the same time Armenian and Russian sources are given in latin fonts.
13. On separate pages is given the translation of the article headquarters and summary. (beseides article presented language), Armenian , Russian (resume) and English (summary).
14. The Articles should be sent to the info@bulletin.am .
15. The published and corrected version of the text are submitted with author(s).
16. On a separate sheet of paper are given the information about the authors (surname, name, affiliation (the whole), picture, academic degree, address, telephon, organization, position, e-mail.

Հոդվածների հեղինակային օրինակների ձևակերպման համար ներկայացվող պահանջներ

Հոդվածները կարելի է ներկայացնել հայերենով, ռուսերենով և անգլերենով՝ մինչև 14 էջի ("Էկոնոմիկա" խորագրով՝ մինչև 24 էջի) սահմաններում.
Էջի ֆորմատը՝ A4, լուսանցքները՝ վերևից, ներքևից, աջից և ձախից՝ 18 մմ.
Տառատեսակը հայերեն՝ Unicode /GHEA Grapalat/, ռուսերեն և անգլերեն՝ Times New Roman.
Միջտողային հեռավորությունը՝ 1,15:

1. Էջի վերին աջ անկյունում, հոդվածի ներկայացման լեզվով, գլխատառերով՝, հայերեն՝ 11, ռուսերեն և անգլերեն՝ 12 **bold** տառաչափով տրվում է հոդվածի խորագիրը:
2. Հաջորդ տողի Էջի ձախ անկյունում տրվում է ՀՏԴ-ն՝ առնվազն վեցանիշ թվով:
3. Դրանից մեկ տող ներքև, մեջտեղում, հոդվածի ներկայացման լեզվով գլխատառերով դրվում է վերնագիրը՝ հայերեն՝ 12 **bold**, ռուսերեն և անգլերեն՝ 14 **bold** տառաչափով:
4. Երկու տող ներքև, ձախից, հոդվածի ներկայացման լեզվով, հեղինակի (հեղինակների, որոնց թիվը, որպես կանոն, չի կարող գերազանցել 4-ը) Անվան, Հայրանվան սկզբնատառերը և Ազգանունը՝ հայերեն՝ 11, ռուսերեն և անգլերեն՝ 12 **bold** տառաչափով:
5. Մեկ տող ներքև, ձախից, հոդվածի ներկայացման լեզվով, շեղատառերով (*Italic*) տրվում է կազմակերպության (կազմակերպությունների) անվանումը՝ հայերեն՝ 9, ռուսերեն և անգլերեն՝ 10 տառաչափով:
6. Անջատելով տեքստը հորիզոնական հոծ գծով՝ էջի ձախ անկյունից, հոդվածի ներկայացման լեզվով, տրվում են Բանալի բառերը (5-8 բառ)՝ հայերեն՝ 10, ռուսերեն և անգլերեն՝ 11 տառաչափով:
7. Երկու տող ներքև, հոդվածի ներկայացման լեզվով, մեջտեղում, շեղատառերով (*Italic*), գրվում է հոդվածի համառոտագիրը՝ 10-20 տող՝ հայերեն՝ 9, ռուսերեն և անգլերեն՝ 10 տառաչափով:
8. Երկու տող ներքև ներկայացվում է հոդվածի հիմնական տեքստը՝ հայերեն՝ 10, ռուսերեն և անգլերեն՝ 11 տառաչափով: Պարբերությունները սկսվում են նոր տողից՝ 10 մմ խորքից: Երաշխավորվում է նյութի շարադրման հետևյալ սխեման. «***Ներածություն***», «***Խնդրի դրվածքը***», «***Հետազոտության արդյունքները***», «***Եզրակացություն***»: Անհրաժեշտության դեպքում կարող են լինել նաև այլ բաժիններ՝ համապատասխան վերնագրերով:
9. Բանաձևերը ներկայացվում են առանձին տողով, մեջտեղում և համարակալվում են աջ մասում, փակագծերի մեջ: Բանաձևերը, ինչպես նաև տեքստում տեղադրվող մաթեմատիկական սիմվոլներն ու արտահայտությունները տրվում են Microsoft Equation-ով, Italic՝ 10 տառաչափով:
10. Տեքստում կարող են լինել նկարներ, գծապատկերներ, գծագրեր և աղյուսակներ: Նկարները և գծապատկերները համարակալվում են միջանցիկ համարակալմամբ՝ «**Նկ.**» նմուշառմամբ: Նկարների, գծապատկերների, գծագրերի անվանումները, նշանակումների բացատրությունները տրվում են ներքևում: Դրանք կարելի է տեղադրել ուղղաձիգ կամ հորիզոնական դիրքով՝ հայերեն՝ 9, ռուսերեն և անգլերեն՝ 10 **bold** տառաչափով: Աղյուսակները համարակալվում են միջանցիկ համարակալմամբ՝ «**Աղ.**» նմուշառմամբ: Աղյուսակների անվանումները, նշանակումների բացատրությունները տրվում են վերևում: Դրանք կարելի է տեղադրել ուղղաձիգ կամ հորիզոնական դիրքով: Եթե մեկ թերթի վրա աղյուսակը չի տեղավորվում, պետք է շարունակել մյուս թերթի վրա՝ նշելով, որ շարունակությունն է: Աղյուսակի սյունյակներում ազատ տեղեր չպետք է մնան. պետք է դնել գծիկ կամ գրել «չկա» («չի որոշված»):
11. Նկարները, գծապատկերները, գծագրերը էլեկտրոնային տարբերակով, որպես օրենք, տրվում են գունավոր տարբերակով:
12. Հոդվածի վերջում, երկու տող ներքև, ձախից՝ 10 մմ խորքից տպագրվում է «**Գրականություն**»՝ հայերեն՝ 11, ռուսերեն և անգլերեն՝ 12 **bold** տառաչափով: Մեկ տող ներքև ներկայացվում է գրականության ցանկը՝ համարակալված ըստ հղումների հերթականության: Ցանկում աղբյուրները պետք է նշվեն [...] տեսքով և ընդգրկեն՝ հեղինակի/ների/ ազգանունը և անվան /Հայրանունի/ առաջին տառը /երը/, նյութերի լրիվ անվանումը, հրատարակության տվյալները /տեղը, հրատարակչությունը, քաղաքը, տարեթիվը, հատորը, էջերը/: Տեղեկատվական պաշտոնական, այդ թվում՝ էլեկտրոնային աղբյուրների, համակարգչային ծրագրերի, հաշվետվությունների, հրահանգների, հեղինակային իրավունքի արտոնագրերի, պատենտների դեպքում ներկայացվում են լրիվ տվյալները: Աղբյուրները բերվում են բնօրինակի լեզվով: Միևնույն ժամանակ, հայերեն և ռուսերեն աղբյուրները ներկայացվում են նաև լատինատառ շարվածքով:
13. Առանձին էջերի վրա տրվում է հոդվածի գլխամասի և համառոտագրի թարգմանությունը (բացի հոդվածի ներկայացման լեզվի)՝ հայերեն, ռուսերեն (Резюме) և անգլերեն լեզուներով (Summary):
14. Հոդվածները պետք է ուղարկել info@bulletin.am էլ. հասցեով:
15. Տեքստի խմբագրված և սրբագրված տարբերակը համաձայնեցվում է հեղինակ(ներ)ի հետ:
16. Առանձին թղթի վրա տրվում է հեղինակների մասին տվյալները (Ազգանուն, Անուն, Հայրանուն (լրիվ), լուսանկարը, գիտական աստիճանը, գիտական կոչումը, հասցեն, հեռախոսը, կազմակերպությունը, զբաղեցրած պաշտոնը, էլեկտրոնային հասցեն):

Требования, предъявляемые к оформлению авторских образцов статей

Статьи можно представить на армянском, русском и английском языках объемом до 14 страниц (статьи под рубрикой "Экономика" до 24 страниц)
Формат страницы: A4, поля сверху, снизу, справа и слева по 18 мм
Шрифт армянский - Unicode/GHEA Grapalat/, русский и английский - Times New Roman.
Междустрочное расстояние - 1,15

1. В верхнем правом углу страницы заглавными буквами (на языке статьи) записывается название рубруки по шрифту: армянский – 11 **bold**, русский и английский - 12 **bold**.
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4. Две строки ниже, слева, на языке статьи набирается фамилия и инициалы автора (соавторов, как правило, не более 4 человек) по шрифту: армянский – 11 **bold**, русский и английский - 12 **bold**.
5. На следующей строке, слева, на языке статьи курсивом (*Italic*) дается название организации (организаций) по шрифту: армянский - 9, русский и английский - 10.
6. Отделив текст горизонтальной выделенной линией, слева даются ключевые слова (5-8 слов) по шрифту: армянский - 10, русский и английский - 11.
7. Две строки ниже, на языке статьи, по центру курсивом (*Italic*) дается аннотация (10-20 строк) по шрифту: армянский - 9, русский и английский - 10.
8. Две строки ниже, дается основной текст статьи по шрифту: армянский - 10, русский и английский - 11. Абзацы начинаются с новой строки с отступом 10 мм. Рекомендуется следующая схема изложения материала: "Введение", "Постановка задачи", "Результаты исследования", "Заключение". В случае необходимости могут быть также другие разделы с соответствующими названиями.
9. Формулы располагаются отдельной строкой по центру и нумеруются в правой части в скобках. Формулы, а также математические символы и выражения приводятся по “Microsoft Equation”, курсивом (*Italic*) по шрифту - 10.
10. В тексте могут быть рисунки, графики, чертежи и таблицы. Рисунки и графики нумеруются по порядку - "Рис.". Названия рисунков, графиков, чертежей, объяснения обозначений приводятся снизу. Их можно расположить в вертикальном или горизонтальном положении по шрифту: армянский - 9 **bold**, русский и английский - 10 **bold**. Таблицы нумеруются по порядку - "Таб.". Названия таблиц, объяснения обозначений приводятся сверху. Их можно расположить в вертикальном или горизонтальном положении. Если таблица не помещается на одной странице, нужно продолжить ее на следующей странице, отметив, что это продолжение данной таблицы. В таблице не должно быть свободных столбцов, в этом случае нужно поставить черточку или написать "нет" ("не определено").
11. Рисунки, графики и чертежи в электронной версии, как правило, приводятся в цветном варианте.
12. В конце статьи, через две строки, с отступом слева 10 мм печатается "Литература" по шрифту: армянский - 11 **bold**, русский и английский - 12 **bold**. На следующей строке приводится список использованной литературы, пронумерованный по последовательности ссылок. В списке источники должны указываться в виде [...] и включать фамилию и инициалы автора (авторов), полное название статьи (материала), данные публикации (место, издательство, город, год, том, страницы). В случае официальной информации, в том числе электронных источников, компьютерных программ, отчетов, инструкций, сертификатов об авторских правах, патентов, приводятся полные данные. Источники приводятся на языке оригинала. В то же время армянские и русские источники печатаются также латинскими буквами.
13. На отдельных листках дается перевод названия статьи, фамилии и инициалов автора (авторов), названия организации (организаций), ключевых слов и аннотации (кроме языка статьи) на армянский язык (Ամփոփում), русский язык (Резюме) и английский язык (Summary).
14. Статьи нужно отправить на почту info@bulletin.am.
15. Отредактированная версия текста согласовывается с автором (авторами).
16. На отдельном листе приводятся сведения об авторах (Фамилия, Имя, Отчество (полностью), фотография, ученая степень, ученое звание, адрес, номер телефона, организация, занимаемая должность, адрес электронной почты).

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