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Comparative Estimation of Ecological Rent in Absheron and Sheki-Zagatala Economic Regions of Azerbaijan Republic

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Abstract
The article studies the peculiarities of development of the regions in Azerbaijan economy and analyzes some indicators characterizing the current state of economic development and usage of natural resources in Absheron and Sheki-Zagatala economic regions of the country. The ecological potential of the country and its economic regions has significant importance in increasing of the usage of natural resources and in ensuring the sustainable development. By taking into consideration this the essence of ecological rent is explained and for the first time its quantity is determined comparatively in Absheron and Sheki-Zagatala economic regions of Azerbaijan by using N.N. Klyuev method of determining the "ecological tax".

Keywords: ecological rent, sustainable development, oil and natural gas production, Azerbaijan economy, Absheron region, Sheki-Zagatala region, technological and physiological energy consumption, biological productivity, land areas, forests, arable

1. Introduction

Oil and gas resources, which are within of all kinds of natural resources, spreaded wide in various parts of the territory in Azerbaijan, have always exceptional importance from the development point of view of the country. However, usage of oil and gas resources without taking into account the national interests of for a long time has caused unequal development of the productive forces of Azerbaijan regions and creation of great differences in the level of socio-economic development. In the modern period one of the main factors, affecting socio-economic development of the regions, is competition. It shows itself in the aggravation of competition in regional, national and international markets, in particular in the non-price competition in the field of quality of life and innovation (Demyanova and Safiullin, 2009; Simkin, 2010). In the years of independence (from 18 October, 1991) the opportunities have been created in order to overcome the differences in the level of socio-economic development in the regions of country, to ensure a balance between Absheron economic region and other regions for the purpose of a sustainable and competitive economy.
The diversification of economy ensuring sustainability of the development of non-oil sector and regions, further improvement infrastructure and social services in the country are extremely important. The efficient use of natural resources and environmental protection, ecologically sustainable socio-economic development, restoration and improvement of forests, conservation and sustainable use of biodiversity has a great importance too (see also NP, 2003; SP, 2008). For the sake of taking into account the

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long term results, the interests of present and future generations insuring of sustainable development demands the protection of existing ecological systems and economic potential, and rational use of natural resources. Different issues of natural wealth potential usage in the country for development of the economy of Azerbaijan have been investigated by Nadirov, in 2012, 2010; Nuriyev, 2011; Nabiev, 2000; Aliyev and Babayev, 2003; Hajizadeh, 2008; Atakishiyev, 1998; Khidirov and Babayev, 2015; Kadimov, 2006 and others. At the same time, ecological potential of the country has a great importance for efficiency increase in natural resources usage (Granberg and Valentey, 2006; Markandya, 1997; Fomenko et al., 2003). Especially, estimation of ecological rent in the regions of country is topical. However, this problem has not been investigated enough, therefore there is a need to study it. Thus, the aim of this study is comparative estimation of ecological rent as an indicator of sustainable development in Absheron and Sheki-Zagatala economic regions of Azerbaijan Republic.

It should be considered that during the research directions for efficiency increase in rich natural resources usage in Azerbaijan the role of production resources in strengthening the competitive advantages of the product manufacturers and country is determined by their structure, quality, efficiency of use, speed of creation, improvement, adapting to the needs of the national and world economy rather than their reserves, volume, value and favorableness (Porter, 1998). At the same time, it should be noted that the sustainable development of countries and the whole international community can not be provided without changing the methods of production and consumption (Fomenko et al., 2000).

In general, the rational use of natural resources requires wide usage of few waste and no waste production, systems and so on, urgent resolve the interrelated issues as to ensure reproduction natural resources and protection of the environment, as well environmental safety of existence of society.

2. The Analysis of Development Features of Regions in the Economy of Azerbaijan

In the pre-independence period the failure to use Azerbaijan's rich oil and gas resources for national purposes, carrying out the large volumes of crude oil extraction and refining, yielding high returns mainly outside the country, the concentration of other sectors of economy, infrastructure, population along with the oil industry, which did not correspond to the direction of development in the economy and to the local conditions in Absheron economic region has happened. This also has led to emergence and more deepening the differences between the level of general socio-economic development in the territory of Absheron region and other parts of the country (Nadirov, 2010, 2012).

In the early years of independence activities in the direction of reviving the oil industry, the signing of the "Contract of the Century"(the first oil contract, which has been signed on September 20, 1994) has played a major role in the solution of important problems facing of Azerbaijan. At present the measures are being taken to eliminate socio-economic differences of development between the regions of country, emerged during decades as a result of negative impact of unilateral development in the economy with the absolute advantage in oil industry in Azerbaijan, which has completed a period of the economic transition. The balanced, harmonious development of the regions of

Azerbaijan, its productive forces has been determined in the wide range of areas in the State programs on the country's socio-economic development for 2004-2008, 2009-2013 and 2014-2018 years (CLRA, 2004; SP, 2014, 2011, 2009). In accordance with the experience of countries in the world, which have a high level of socio-economic development, balanced development of the regions, balanced regulation of the productive forces in Azerbaijan can be provided by diversification of the economy and efficient integration to the world economy, sustainable development of non-oil sector, improving entrepreneurial environment, increasing investment.

The development of non-oil sector has a great importance in increasing the share of the economy in the regions of Azerbaijan. In recent years the development of these fields of economy have the continuous growth trend. Non-oil GDP growth rate has been 7,9 in 2010, 9,4 in 2011, 9,7 in 2012, 9,8 in 2013, and 7,0 percent in 2014. While in 2011 almost all of the GDP growth fell to the share of non-oil sector and 48,3 percent of GDP was created in this area as a result of the oil production decline in the country due to objective reasons, in 2013 the share of non-oil sector in GDP increasing 3,1 percent than previous year has been 56,6 percent. In the recent years the external factors such as the sharp decline in the world of oil prices and fall national currencies of several countries in the region by creating shocking effect are being influenced the country's macroeconomic indicators. The oil sector is being leaning towards decrease on the background the negative impact of these factors, and the real GDP growth basically takes place due to the non-oil sector. Overall, during 2004-2013 the GDP has increased 3,2 times, the non-oil sector 2,6 times (SSCRA, SYA, 2015, 2010; SOFAZ, 2014, 2011). In 2014 the share of non-oil sector in GDP has already risen to 61 percent.

Beside carring out many important measures in the direction of elimination balanced development of regions in the economy of country, the socio-economic inequality arisen between them for a long time, the analysis of economic indicators shows that there are still differences among the regions. It can be seen more clearly in the diagram informations.

Especially it should be noted that 89,5 percent of industrial output, 75,5 percent of volume of total products, 57,0 percent of retail trade turnover, 70,4 percent of investment directed to fixed capital in 2014 in Azerbaijan has fallen into the share of Absheron economic region, which covers 6,3 percent of the territory of country and where 28,7 per cent of the population has inhabited. If for each square kilometer of land falls 44,3 business entities in Absheron economic region, this figure is equal to 4,4 in the rest of the Republic, or that is 10 times less. At the same time, 97,7 percent of agricultural output, 43,0 percent of retail trade turnover, 29,6 percent of investment directed to fixed capital are concentrated in the other economic regions of the country.

3. Current State of Economic Development in Absheron Economic Region

Absheron economic region, which is situated in the east of the Azerbaijan Republic, in sectors of the Caspian Sea, in a very favorable economic and geographical position, and combined the Absheron Peninsula, eastern part of Gobustan, the islands including Baku and Absheron archipelagos, has the relief, consisting of hilly, foothill plains and low mountains and dry subtropical climate. The economic region are

surrounded by Guba-Khachmaz, Mountain-Shirvan and Aran economic regions. This region includes Baku and Sumgayit cities, the administrative regions of Absheron and Khizi.

Absheron economic region is rich with mineral-raw resources. It has oil, natural gas, limestone, cement, quartz sand, clays, building stones, sand and gravel, bituminous rocks, sedimentary salt reserves. Absheron Peninsula has rich spa resources. Mud volcanoes, saltwater lakes and mineral springs which are in the region have curative importance.

Oil and gas extraction and refining, petrochemical, chemical, electro power engineering, metallurgy, machine-building (mainly petroleum engineering and electrical engineering), construction materials, light and food industries are the basis of the economy in Absheron economic region, which is an important industrial region of the country.

The highly concentrated industry in Absheron economic region has developed based on intensive use of rich local mineral-raw resources (oil, gas, iodine-bromine water resources, mineral-building raw resources etc.) and diversified agricultural raw materials. Rich mineral-raw resources, primarily oil and gas reserves in the region and several socio-economic factors has affected to the formation of the modern economy, structure and specialization of industry in the region.

89,5 percent of industrial production, 57,6 percent of operated industrial enterprises, 96,0 percent of fixed assets and 63,2 percent of employees engaged in industry has fallen into the share of Absheron economic region in 2014 in the country (SSCRA, IA, 2015; SSCRA, SYA, 2015).

Absheron economic region occupies an important place in the oil and natural gas production of Azerbaijan. As it is seen from Table 1 the oil and gas production in Baku has increased continuously during 2000-2010. In 2009 the oil production growth has been 3,7 times more than in 2000 while the natural gas production has been 2,9 times. However, the growth rate of oil production has decreased in 2010 in comparision with previous years. And the production is being declining since 2011. Thus, the oil production has decreased to 10,5 percent in 2011, to 3,9 percent in 2012, to 3,2 percent in 2014 in comparision with to the previous year in Baku.

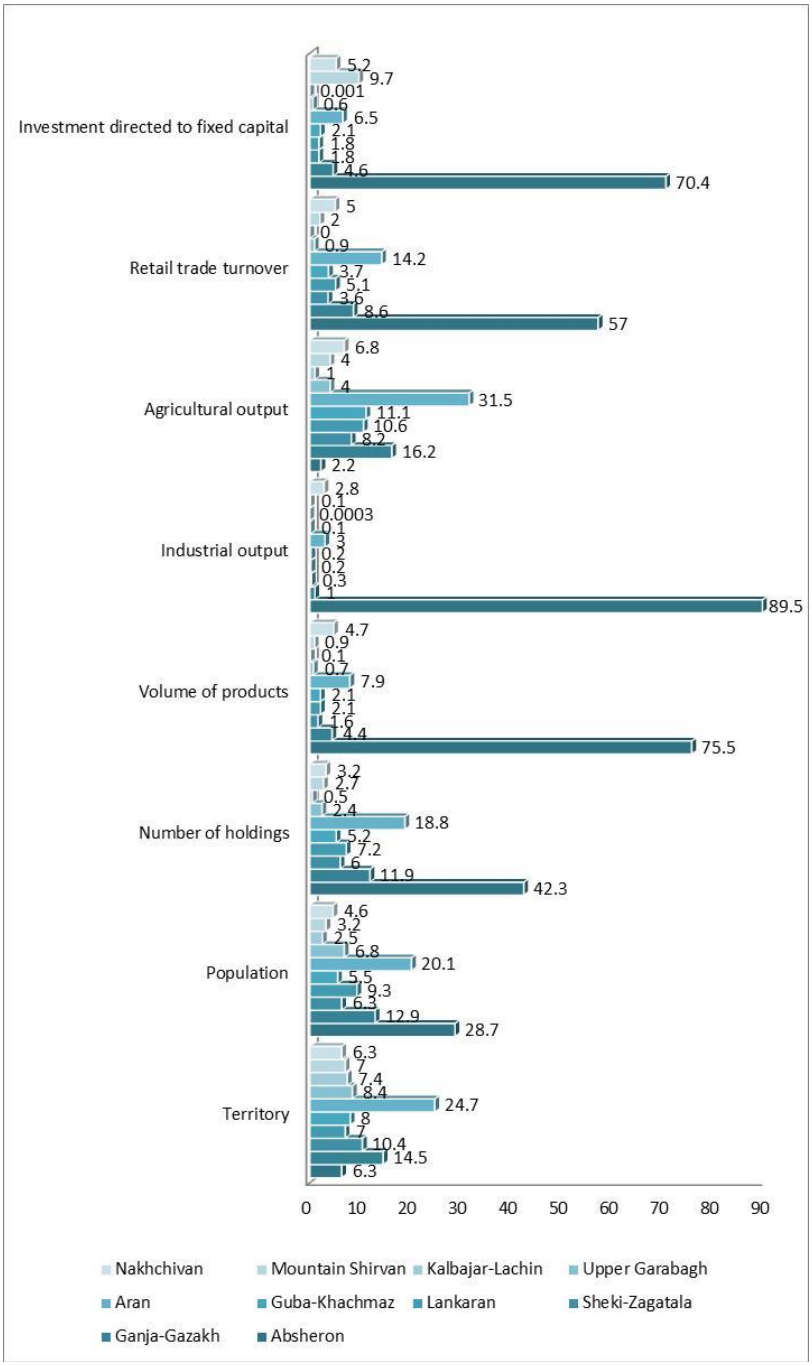

Fig. 1. The share of regions in socio-economic indicators of Azerbaijan, in per cent (2014)

Table 2 shows that the natural gas production has increased to 51,2 percent in 2008 in comparision with previous year in Baku, despite the insignificant decreases in 2009 and 2011(0,2 percent) in comparision with previous year, the production volume has been kept mainly stable from 2008 to 2011, and the growth has also continued during 2012-2014.

Table 1: Oil extraction (including gas condensate) in the regions of Azerbaijan, thousand ton.

	2000	2004	2005	2006*	2007*	2008*	2009*	2010*	2011*	2012	2013	2014
Azerbaijan, total	**14017,0**	**15548,8**	**22214,2**	**32185,6**	**42523,2**	**44395,4**	**50364,0**	**50692**	**45375**	**43617**	**43457**	**42076**
Baku city	13564,5	14613,8	21252,8	31234,3	41627,0	43512,2	49503,0	49936	44673	42982	42558	41366
Siyazan	58,2	48,9	42,2	44,9	48,7	47,3	44,3	40,1	48,2	48,2	49.2	49.8
Neftchala	42,2	42,7	45,8	47,3	46,3	44,0	50,7	48,4	39,3	37,1	40.9	44.4
Salyan	–	369,7	344,0	306,8	303,5	257,9	236,0	221,8	209,0	193,1	187.3	183.7
Imishly	–	30,5	30,4	26,0	28,4	33,2	31,0	31,4	26,9	24,1	19.5	19
Shirvan	352,1	443,2	499,0	526,3	469,3	500,8	498,6	414,4	378,7	333,2	308.1	289.8

* volume of commodity

Data Sources: SSCRA, SYA, 2015,2010; SSCRA, IA, 2015, 2005.

Table 2: Natural gas extraction in the regions of Azerbaijan, million cubic meter.

	2000	2004	2005	2006*	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*
Azerbaijan, total	**5643**	**4995**	**5732**	**6080**	**10832**	**16337**	**16325**	**16673**	**16361**	**17242**	**17895**	**18827**
Baku city	5557	4858	5611	6016	10770	16279,4	16271,2	16616	16318	17191	17846	18777
Siyazan	39,7	19,7	18,3	11,6	11,7	8,2	7,2	7,4	8,0	7,9	7.2	7.3
Neftchala	24,1	25,4	25,9	24,1	24,3	25,6	24,4	26,4	4,3	8,9	0.4	--
Salyan	–	72,9	54,8	16,2	11,7	13,9	11,4	14,1	22,9	24,3	30.2	32.6
Imishly	–	0,6	0,6	–	–	–	–	--	--	--	--	--
Shirvan	21,8	19,2	21,2	21,4	14,3	9,4	10,8	9,0	8,0	10,0	11.6	10.0

* volume of commodity

Data Sources: SSCRA, SYA, 2015,2010; SSCRA, IA, 2015, 2005.

Generally, 98,3 percent of the oil, and 99,7 percent of natural gas extracted in Azerbaijan has fallen into the share of Baku (Absheron economic region) in 2014. Oil and gas extraction share of the other regions of Azerbaijan in is extremely low. The growth of oil extraction of other regions in 2000-2009 has been registered in Shirvan and Salyan regions, while it has mainly remained stable in the rest of regions. However, oil extraction has decreased in the other regions, except Siyazan region in 2010-2012. Even the growth has also occured in Neftchala region side by side Siyazan during 2013-2014, the decrease has continued in the rest of regions.

The decrease has been mainly observed in gas extraction in regions, while the high growth has been only registered in Salyan region in 2003-2004, but the gas extraction has also decreased sharply here in the following years. However from 2011 the extraction began to increase in Salyan, in 2014 than 2010 it rised 2,3 times. Though the gas extraction mainly has been kept in stable, law level in Siyazan and Shirvan, in Neftchala the extraction in 2013 has decreased 22,3 times than previous year and has stopped in 2014.

4. Main Features of Economic Development in Sheki-Zagatala Economic Region

Sheki-Zagatala economic region, which is situated in the north-west of Azerbaijan, on the southern slope of complicated relief and geological structure in the Greater Caucasus, has various rich mineral-raw resources. The soils useful for agriculture situated on Alazan-Haftaran valley, the foothills area and Ajinohur plateau are mainly scanty due to mountainous relief and vast area of forests. Fertile lands, abundant water resources, normal humidity balance, forests, alpine and sub-alpine meadows, and Ajinohur winter pastures in the region creates favorable conditions for the development of agriculture and animal husbandry. The agriculture has developed more intensive in the densely populated Alazan-Haftaran valley.

In 2014 1,6 percent of volume of total products, 0,3 percent of industrial output, 4,6 percent of operated industrial enterprises, 0,5 percent of fixed assets, 1,8 percent of investment directed to fixed capital and 2,7 percent of employees engaged in industry, 3,6 per cent of retail trade turnover has fallen into the share of Sheki-Zagatala economic region of the country which covers 10,4 percent of the territory of country and where 6,3 percent of the population has inhabited. If for each square kilometer of land falls 44,3 business entities in Absheron economic region, then in Shaki-Zagatala economic region this figure is equal to 4,1, that is, it is approximately 11 times low (SSCRA, IA, 2015; SSCRA, SYA, 2015).

As a result of economic activity in connection with the favorable relief and climatic conditions in Qanikh-Ayrichay valley of Shaki-Zagatala economic region a significant part of natural landscapes have turned into anthropogenic landscapes (Rustamova, 2008; Eminov, 2004). Carring out complex measures in the direction for efficiency in natural resources usage in Sheki-Zagatala region will create opportunities to ensure sustainable development in the region.

However, this region on the southern slope of the Greater Caucasus has partially, less subjected to the anthropogenic pressure in Azerbaijan (IGANAS, 2003). The means of Great Caucasus region in Azerbaijan to produce oxygen is 30 million tons per year. The presence of a large area of forests, the functioning of industrial enterprises much less, that can damage the environment and people, polluting the atmosphere is of crucial importance here (Khalilov, 2006; IGANAS, 2003).

5. Estimation of Ecological Rent for Sheki-Zagatala and Absheron Economic Regions

At present, using a variety of methods and approaches could be of great importance in order to obtain a more complete economic value of natural resources and services taking into account future environmental risks and uncertainty substantially (Rubio 2005, 2004; Haberl, 2015). Taking into account the ecological factors a money valuation of natural resources shows the value of the natural resources existing in the area, the relations between economic and environmental indicators. In this case it is possible to determine in money terms the results of interactions with concrete field of economic activity and condition of the environment (Markandya, 1997; Fomenko et al., 2003). Taking into account the concept of sustainable development and its priorities,

long-term results, interests of future generations, the principle of efficient use of natural resources choosing the correct discount indicator is required. The application of methods and approaches including the selection of substantiated discount rates should be important condition in efficient use of mineral-raw resources. İn this regard, determination of ecological rent indicator is of great importance.

There are deep contradictions between choosing most abundant resources, high discount norms in order to ensure high economic efficiency of natural resources and preventing the exhaustion of natural resources, ecological environment protection, sustainable development objectives, and one of the main challenges facing scientific researches is to resolve this contradiction.

Ecological potential of the country has crucial importance in the rise of use of natural resources potential of the country. There are different approaches which are put forward by some authors for the purpose to determine the ecological rent. One of the most interesting approaches is a method of determination the "ecological tax" by Klyuev N.N.

Let us note that the ecological rent is not the same as the natural rent. Despite natural environment acts as a source of its emergence, the content is different in principle. If natural rent arises as a result of the use of natural resources and its quantity depends on the quality, accessibility and location of these resources, ecological rent emerges only in the event that natural environment is not affected by the anthropogenous impact or this effect is less and allows to maintain environmental sustainability. In this case, how little natural environment undergo the impact, the quantity of ecological rent gets so much more and therefore it directly depends on the volume of natural resources, which has not been attracted to the economic turnover (Granberg and Valentey, 2006). Ecological rent indicators for world countries has been given in Table 3:

Table 3: Estimations for ecological rent indicators

Regions and Countries	**Indicators**				
	$\frac{E_T+E_F}{S}$	$\frac{S_P}{S_F}$	$\frac{S-S_V}{S}$	$\frac{P_c}{P_R}$	N
World	2,65	0,35	0,57	1,0	0,5287
Brasil	0,52	0,1	0,65	0,13	0,0044
China	3,72	0,76	0,98	0,21	0,5818
Japan	48,04	0,18	0,63	0,36	1,9612
USA	8,69	0,65	0,89	0,41	2,0611
India	4,06	2,48	0,96	0,25	2,4165
Germany	40,58	1,13	1,0	0,33	15,1323
Netherlands	99,82	2,71	0,80	0,58	125,5177

Source: Granberg and Valentey, 2006.

In this regard, let us estimate indicators of ecological rent in Absheron and Sheki-Zagatala economic regions of Azerbaijan by using N.N. Klyuev method of determining the "ecological tax":

$$N = \frac{E_T+E_F}{S} \times \frac{S_P}{S_F} \times \frac{S-S_V}{S} \times \frac{P_c}{P_R} \qquad (1)$$

Here - E_T və E_F accordingly is the technological and physiological energy consumption;

$E_F = K \times İ$ (K – the average calorie nutrition of population , I – the number of

population);
S - the territory of region;
S_P – the land areas, which are caught by arable;
S_F – the land areas, which are caught by forests;
S_V - the area of practically untapped, "virgin" lands and protected nature territories;
P_c – the average biological productivity of natural landscapes in the country;
P_R – the average biological productivity of natural landscapes in the region.
The territory of Sheki-Zagatala economic region is 8,96 thousand square kilometers. İn the region the land areas, which are caught by forests are 334200 hectares, and the land areas, which are caught by arable are 207931 hectares. The area of practically untapped, "virgin" lands and protected nature territories is 158173,5 hectares, the number of population has been 593,2 thousand persons till January 1, 2014.
The total area of forest cover in Absheron economic region having the lowest indicator comparision with the other economic regions of the country is 25506 hectares, and the land areas, which are caught by arable are 4446 hectares. The area of practically untapped, "virgin" lands and protected nature territories is 31927,6 hectares. The territory of Absheron economic region is 5,87 thousand square kilometers, the number of population has been 2727,1 thousand persons till January 1, 2014.
The optimal calorie level of food products consumed by the population is 2353 kilocalories per day. In 2008 this figure has been 2409 kcal in Azerbaijan and 2646 kcal in Kazakhstan, which is Azerbaijan's neighbor and a member of the Commonwealth of Independent States (CIS) together with it. In 2011 the calorie nutrition has reached 3140 kcal in Kazakhstan (Kaigorodtsev and Kirdasinova, 2013). On this basis, this figure has been determined at the level of 2903 kcal in Azerbaijan.
1 hectare forest allows to ensure 200 people by oxygen in 1 hour. Daily demand for oxygen of a person is 0,86 kg. The average biological productivity of natural landscapes has been estimated on the basis of forest cover. The total area of forests is 1021 thousand hectares in the country.

Table 4: The volume of energy consumed for business purposes (2012)

Energy types	Sheki-Zagatala economic region	Absheron economic region
Natural gas, thousand cubic meter	15370,3	143469,7
Electricity, thousand kWt hour	40883,4	551505,3
Motor gasoline, ton	2637	39279,2
Diesel fuel,ton	1738,4	10670,6
Liquefied petroleum gas, ton	50,3	791,2
Kerosene, ton	2,9	11,8
Heat energy,Gkal	181,6	3724,8
Wood, thousand cubic meter	12,1	39,7
Wood coal, ton	4,3	0,2
Other fuel products	39,7	59,1

Data Source: SSCRA, 2013

Table 5: The volume of fuel and energy consumption by households (2010)

Energy types	Sheki-Zagatala economic region	Absheron economic region
Natural gas, million cubic meter	111,9	1727,5
Electricity, million kWt hour	257,2	2878
Fuel (used in motor vehicles):		
Motor gasoline, thousand ton	54,2	289,6
Diesel fuel,ton	30,4	38,9
Liquefied petroleum gas, ton	0,2	0,4
Fuel used for domestic purposes:		
Motor gasoline, thousand ton	0,2	0,1
Diesel fuel,ton	2,2	0,3
Liquefied petroleum gas, ton	6,8	0,6
Kerosene, ton	0,1	0,2
Wood, thousand cubic meter	41,0	-

Data Source: SSCRA, 2011

Table 6: Calorific value of fuel and energy, in Kcal

Energy types, in unit	Calorie, Kcal
Natural gas, cubic meter	10250
Electricity, million kWt hour	859,85
Motor gasoline, kg	11250
Diesel fuel, kg	10700
Liquefied petroleum gas, kg	13250
Kerosene, ton	8350
Wood, kg	4000
Wood coal, kg, (×550 kg/ cubic meter)	7050
Other fuel products	2000

Data Sources: HE, 2015; TP, 2015; ITP, 2015; GEO, 2015; FE, 2015.

Table 7: The volume of energy consumed for business purposes, in Gcal (2012)

Energy types	Sheki-Zagatala economic region	Absheron economic region
Natural gas	157,6	1470,6
Electricity	35,2	474,2
Motor gasoline	29,7	441,9
Diesel fuel	18,6	114,2
Liquefied petroleum gas	0,6665	10,5
Kerosene	0,0242	0,0985
Heat energy	181,6	3724,8
Wood	26,62	87,3
Wood coal	0,0303	0,00141
Other fuel products	0,0794	0,1182

** has been compiled by author*

Table 8: The volume of fuel and energy consumption by households, in Gcal (2010)

Energy types	Sheki-Zagatala economic region	Absheron economic region
Natural gas	1146,98	17706,9
Electricity	221,2	2474,65
Fuel (used in motor vehicles):		
Motor gasoline	0,609	3258
Diesel fuel	0,325	416,2
Liquefied petroleum gas	0,00265	5,3
Fuel used for domestic purposes:		
Motor gasoline	0,00225	1,125
Diesel fuel	0,0235	3,21
Liquefied petroleum gas	0,0901	7,95
Kerosene	0,000835	1,67
Wood	90,2	-

** has been compiled by author*

Let's estimate the ecological rent in Sheki-Zagatala economic region of Azerbaijan on the basis of the indicators mentioned above:

$$\frac{E_T+E_F}{S} = \frac{1727{,}95\times10^9 kcal + 2903\ kcal\times365\ day\times593200\ person\ )}{8960\ km^2} =$$

$$= \frac{(1727{,}95+628{,}55)\ Gcal}{8960\ km^2} = \frac{2356{,}5}{8960} = 0{,}2630$$

$$\frac{S_P}{S_F} = \frac{207931\ \text{ha}}{334200\ \text{ha}} = 0{,}6222$$

$$\frac{S-S_V}{S} = \frac{8960 km^2 - 1581{,}735 km^2}{8960\ km^2} = \frac{7378{,}247}{8960} = 0{,}8235$$

$$\frac{P_c}{P_R} = \frac{1021000\ ha\times 62721{,}6\ kg/year}{334200\ ha\times 62721{,}6\ kg/year} = \frac{64038753600}{20961558720} = 3{,}0551$$

$$\boldsymbol{N = 0{,}2630 \times 0{,}6222 \times 0{,}8235 \times 3{,}0551 = 0{,}4117}$$

And now let's estimate the ecological rent in Absheron economic region of Azerbaijan according to the indicators mentioned above:

$$\frac{E_T+E_F}{S} = \frac{(30198{,}72\times10^9 kcal + 2903\ kcal\times365\ day\times2727100\ person\ )}{5870\ km^2} =$$

$$= \frac{(30198{,}72+2889{,}6)\ Gcal}{5870\ km^2} = \frac{33088{,}323}{5870} = 5{,}6369$$

$$\frac{S_P}{S_F} = \frac{4446\ \text{ha}}{25506\ \text{ha}} = 0{,}1743$$

$$\frac{S-S_V}{S} = \frac{5870 km^2 - 319{,}276 km^2}{5870\ km^2} = \frac{5550{,}724}{5870} = 0{,}9456$$

$$\frac{P_c}{P_R} = \frac{1021000\ ha\times 62721{,}6\ kg/year}{25506\ ha\times 62721{,}6\ kg/year} = \frac{64038753600}{1599777129{,}6} = 40{,}0298$$

$$\boldsymbol{N = 5{,}6369 \times 0{,}1743 \times 0{,}9456 \times 40{,}0298 = 37{,}1902}$$

Table 9: Estimations for ecological rent indicators

Regions and Countries	Indicators				
	$\frac{E_T+E_F}{S}$	$\frac{S_P}{S_F}$	$\frac{S-S_V}{S}$	$\frac{P_c}{P_R}$	N
World	2,65	0,35	0,57	1,0	0,5287
Sheki-Zagatala	**0,2630**	**0,6222**	**0,8235**	**3,0551***	**0,4117**
Absheron	**5,6369**	**0,1743**	**0,9456**	**40,0298***	**37,1902**

** Estimation has only been made on the basis of total area of forests in the regions of Azerbaijan*

Conclusions

The existence of deep contradiction between ensuring high economic benefits and environmental protection, sustainable development objectives necessitates more extensive develop researches on economic valuation of natural resources, transition into the System of Environmental-Economic Accounting. So indicators of ecological rent in Absheron and Sheki-Zagatala economic regions of Azerbaijan has been estimated by using the method of determining the "ecological tax" by N.N. Klyuev. As can be seen from the assesment, if the quantity of ecological rent has been 37,1902 in Absheron economic region, which has essential share of industrial output, volume of total products, retail trade turnover, investment directed to fixed capital in Azerbaijan mainly at the expense of natural oil rent, but the indicator of ecological rent has been 0,4117 in Sheki-Zagatala economic region, which has very low specific weight of the indicators mentioned above in country, but produces large volume of oxygen at the expense of rich forest cover having significant economic and ecological potential. It is proposed to use ecological rent indicator as an important index of regional sustainable development. This indicator may also be useful in economic valuation of natural resources, determination of ecological and economical efficiency, improvement of tax relations in the country and its regions.

References

Abdullayev S.E., Khidirov B.S., Asker-zade S.M. et al. The role of lubricating oils production in deepening of oil refining // J. Processes of petrochemistry and oil refining(Azerbaijan), 2003, № 4(15), p.25-26.

Ahmadov N.V., 2010. Some issues of oil refining industry development in Azerbaijan. J.Issues of Economic Sciences, Mocsow, 4 (43), pp. 23-26.

Ahmadov N.V., 2011. Innovative opportunities for mineral industries development in Absheron economic region. In: Voytova İ.V.(Ed.), Materials of international scientific-practical conference "2nd Belarusian Innovation Forum", Minsk, Kovcheg Press, pp. 813-818.

Ahmadov N.V., 2015. Some issues of rational usage of natural resources in Sheki-Zagatala region. In: Materials of Respublican scientific-practical conference "Regional manage-ment: innovative approaches and perspective opportunities", Science and Education Press, Baku, pp. 204-208.

Ahmadov N.V., 2012. Rent approach to valuing mineral resources. İn: Materials of international scientific-practical conference "The development of national economy and problems for its efficiency increase", Baku, Cooperation Press, pp. 476-480.

Akhmedov, N.V., 2012. Directions for efficiency increase in mineral raw resources usage in Absheron economic region. J. Actual Problems of Economics, 10 (136), pp. 334-343.

Aliyev T.N., Babayev M.T., 2003. Economic potential of the oil and gas extracting industry. Baku, Azerneshr Press, 267 p.

Atakishiyev M.D., 1998.Problems of efficient use of the economic potential in drilling. Baku, Elm Press, 196 p.

Budagov B. (Ed.), 2009. Ecological atlas, Baku, Baku Cartography Factory, 156 p.

CLRA, 2004. State Program on socio-economic development of regions of the Republic of Azerbaijan (2004-2008 years). Collection of Laws of the Republic of Azerbaijan, 2, pp. 339-358.

De Ferranti, D., Perry E., Ledrman D., Maloney F., 2002. From natural resources to the knowledge economy: trade and job quality.The World Bank, Washington, D.C., 186 p.

Demyanova, O.V., Safiullin, A.R., 2009. Modern approaches to the assessment of the compete-tiveeness of the region (on the example of the Republic of Tatarstan). J. Economic sciences, 8 (57), pp.246-249.

Eminov, Z.N., 2004. Geography. Baku, 656 p.

Enright, J. Michael, 2001. An Overview of Regional Clusters and Clustering. TCI Conference Report, "Clusters and the New Economy", p.2-4.

FE, 2015. Forum for ecologists. forum.integral.ru, accessed 13.08.2015.
Fomenko, G.A., Fomenko, M.A., Loshadkin, K.A., 2000. The monetary valuation of natural resources and ecosystem services in the territorial development: adapting the methodological approaches of United Nations in Russia (scientific and practical recommendations), Yaroslavl, NPP "Cadastr" Press, 128 p.
Fomenko, G.A., Loshadkin, K.A., MA Fomenko, 2003. Monetary valuation of natural goods and ecosystem services in the analysis of regional development. İn: Materials of interregional scientific-practical conference "Innovations in rational use of nature and protection of the environment", Yaroslavl, NPP "Cadastr" Press, pp. 173-186.
GEO, 2015. Great Encyclopedia of Oil and Gas. www.ngpedia.ru, accessed 12.08.2015.
Granberg, A.G., Valentey, S.D. (Eds.), 2006. Movement of Russian regions to innovative economy. Moscow, Nauka Press, 402 p.
Haberl, H., 2015. Competition for land: A sociometabolic perspective. Ecological Economics, 119, pp. 424–431.
Hajizadeh E.M., 2008. Problems of diversification of business activity in the fuel and energy complex. J. Azerbaijan Oil Industry, 5, pp. 59-62.
Hajizadeh E.M., Abdullayev Z.S., 2003. The modernization of economic structure in the oil industry. Baku, Elm Press, 512 p.
HE, 2015. Calorific Value of Fuel. Handbook of engineer. http://tehtab.ru/Guide/GuidePhysics/GuidePhysicsHeatAndTemperature/ComnustionEnergy/FuelsHigherCaloricValues/, accessed 10.08.2015.
IGANAS, 2003. Institute of Geography of Azerbaijan National Academy of Sciences. The regi-onal geographical problems of Azerbaijan. Sheki-Zagatala economic region. Baku, 190 p.
International Energy Agency. World Energy Outlook 2008. Paris, 2008, 578 p.
Ismayilov, S., 2009. The new stage in development of the non-oil branches of industry. J. Economics and Auditing (Azerbaijan), 2, pp.12-18.
ITP, 2015. Independent trading platform for oil products in Russia and CIS. www.nge.ru, accessed 16.08.2015.
Jeffrey, D. Sachs, Andrew, M. Warner, 2001. The curse of natural resources // European Economic Review, vol. 45(4-6), May, p. 827-838.
Joseph, E. Stiglitz, 2002. Information and the change in the paradigm in economics. J. American Economic Review, vol. 92(3), Jun., , pp. 460-501.
Kadimov A.G., 2006. Economic problems of the energy sector in Azerbaijan. Baku, Elm Press, 252 p.
Kaigorodtsev A., Kirdasinova K., 2013. Food security of Kazakhstan: assessment of state and the ways to maintain it. J. Actual Problems of Economics, 6 (144), pp 247-257.
Khalilov, Sh., 2006. The ecogeographical problems of Azerbaijan. Baku, 160 p.
Khidirov, B.S., Babayev, N.G., 2015. Some issues of technological modernization of SOCAR oil-refining complex. J. Azerbaijan Oil Industry, 1, pp.50-57.
Khidirov B.S.,1990. Main directions for efficiency increase in oil processing in Azerbaijan. Baku, Elm Press, 168 p.
Leamer, Edward E., Hugo Maul, Sergio Rodriguez, and Peter K. Schott.1999. Does natural resource abundance increase Latin American inequality? Journal of Development Economics 59, pp.3-42.
Lodhi, S., Makki, M., 2010. A Natural resource management framework for sustainable development. Pakistan Journal of Commerce and Social Sciences, Vol. 4 (1), 56-68.
Mammadov, G. Sh., Khalilov, M.Y., 2006. Ecology, Environment and Man. Baku, Elm Press, 608 p.
Markandya, A.A., 1997. International experience information systems creation in the sphere of environmental management. In: Environmental Management for Sustainable Development: Collected papers. NPP "Kadastr" Press, Yaroslavl, pp. 137-139.
Murshed, S. Mansoob, 2004. When does natural resource abundance lead to a resource curse? International Institute for Environment and Development, London, 50 p.
Nabiyev, N.A., 2000. Economy, society and ecological environment. Baku, Agrydag Press, 696 p.
Nadirov, A.A., 2010. Important condition for balanced socio-economic development of regions. J. Economy and audit (Azerbaijan), 3, 11-15.
Nadirov, A.A., 2012. Constantly rising period of independence in Azerbaijan economy. Baku, 359 p.
Nadirov A.A., Muradov Sh.M., Nuriyev A.H., Huseynov T.T., 2003. The economy of Azerbaijan. Baku, Elm Press, 341 p.

Neumayer, E., 2004. Does the "Resource Curse" hold for Growth in Genuine Income as Well?. J. World Development, , vol. 32(10), October, p.1627-1640.
Porter, E. Michael, 1998. The competitive advantage of nations. Free Press, 896 p.
Nuriyev, A.Kh., 2011. Regional policy and governance fundamentals. Baku, Science and Education Press, 513 p.
NP, 2003. National program on ecologically sustainable socio-economic development of the Republic of Azerbaijan. http://eco.gov.az/az/370-azerbaycan, accessed 11.01.2015.
OECD, 2008. Natural resources and pro-poor growth. The economics and politics. OECD Publishing, Paris, 2008, 166 p.
Pearce, D,Turner, K., Bateman, İ., 1993. Environmental Economics: An Elementary Introduction. The Hopkins University Press, Baltimore, 328 p.
Rubio, M. del Mar, 2005. Value and Depreciation of Mineral Resources Over the Very Long Run: An Empirical Contrast of Different Methods. Economics Working Papers, Universitat Pompeu Fabra series, No 867. May, 50 p.
Rubio, M. del Mar, 2004. The capital gains from trade are not enough: evidence from the environmental accounts of Venezuela and Mexico, Journal of Environmental Economics and Management, , vol. 48(3), November, pp. 1175-1191.
Rustamova, A.M., 2008. Properties of microelements in soil-plant system of landscapes in Qanikh-Ayrichay valley, in: The ecogeographical challenges in nature of Azerbaijan. Works of the Azerbaijan Geographic Society. Volume XII, Baku, pp. 126-130.
SSCRA, SYA, 2015. State Statistical Committee of the Republic of Azerbaijan,. Statistical Yearbook of Azerbaijan, Baku, Seda Press, 814 p.
SSCRA, SYA, 2010. State Statistical Committee of the Republic of Azerbaijan,. Statistical Yearbook of Azerbaijan, Baku, Seda Press, 840 p.
Simkin, D.G., 2010. Theoretical foundations of development of the region in modern conditions. Herald of OSU, 8 (114) , pp. 114-117.
SOFAZ, 2011. Annual report. The State Oil Fund of the Republic of Azerbaijan http://www.oilfund.az/uploads/annual_2011en.pdf, accessed 16.05.2015.
SOFAZ, 2014. Annual report. The State Oil Fund of the Republic of Azerbaijan http://www.oilfund.az/uploads/annual_2014en.pdf, accessed 06.10.2015.
SSCRA, IA, 2015. Industry of Azerbaijan. Statistical Yearbook, State Statistical Committee of the Republic of Azerbaijan, Baku, Seda Press, 344 p.
SSCRA, IA, 2005. Industry of Azerbaijan. Statistical Yearbook, State Statistical Committee of the Republic of Azerbaijan, Baku, Seda Press, 498 p.
SSCRA, 2013. Results of 2012 sample statistical survey on consumption and production of types of energy by private enterpreneurs (natural) entities. State Statistical Committee of the Republic of Azerbaijan. Baku, 61 p.
SSCRA, 2011. About results of the survey on fuel and energy consumption in households in 2010. State Statistical Committee of the Republic of Azerbaijan Baku, 11 p.
SP, 2008. State Program on poverty reduction and sustainable development in the Republic of Azerbaijan for 2008-2015. http://www.economy.gov.az/index.php? option =com_ content-&view=article&id=249, accessed 16.01.2016.
SP, 2014. State Program on socio-economic development of regions of the Republic of Azerbaijan for 2014-2018 years. http://www.economy.gov. az/index. php?option=com_ content &view=article&id=2094, accessed 02.12.2015.
SP, 2011. State Program on socio-economic development of Baku city and its settlements in 2011-2013 years. http://www.economy.gov.az/index.php? option= com_content &view= article&id=180, accessed 10.01.2016.
SP, 2009. State Program on socio-economic development of Regions of the Re-public of Azerbaijan for 2009-2013 years. http://www.economy.gov.az/index. php? option=com _content &view=article&id=194, accessed 12.11.2015.
TP, 2015. Calorific value of wood. http://tehnopost.kiev.ua/drova/13-teplotvor nost-drevesi-ny.html, accessed 15.08.2015.
United Nations, 2000. Integrated Environment and Economic Accounting. An Operational Manual. Series F, No. 78, Handbook of national accounting. New York.