Role of Agriculture to GDP and National per Capita Income Growth-What do Global Data Reveal for Albania?

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ABSTRACT— The purpose of this study is to analyze the empirical relationships between growth and the contribution of agriculture to GDP, economic growth in general, and the economic development of a country expressed as national per capita income. At the same time, the level of the relevant indicators of Albania is discussed. To this purpose are analyzed the data for 2018 and over 180 countries of the world, using descriptive and statistical regression methods. The study highlights important empirical relationships between these indicators. We estimate that an increase in the per capita income is in an inverse relationship with the growth of agriculture as well as its role in the economy. The study concludes that the higher contribution of agriculture to GDP is a factor that positively affects economic growth. Economic growth is positively related to the growth of the agricultural sector but its effect is inelastic. The analysis of data reveals the relatively poor levels of Albania in terms of per capita income and the high contribution of agriculture to GDP. In addition, it is estimated that Albania's economic and agricultural growth for the year 2018 could have been higher. Based on the level of per capita income, Albania's economic growth could be higher than 4%. To increase the role of agriculture in the economy, the study emphasizes the need for policies aiming at increasing labor and land productivity in agriculture.

KEYWORDS: Agriculture, GDP, Growth, Income, Regression

1. INTRODUCTION

Growth of the economy and that of the agriculture sector, the percentage of agriculture in GDP and the level of economic development, are key economic indicators for a country. Their analysis helps for a rapid, *grosso modo* assessment of a country's economic and agricultural development, the weight and role that the agricultural sector plays in this development as well as the role or implications of the level of development in the relationships or associations between these indicators. The empirical relationships, associations or interdependencies between these indicators on a global scale have not been fully examined. For example there is no information about the strength, and especially the form of these associations, or about the speed of their change in relation to each other. For example, is there a relationship between the share of the agricultural sector in GDP and the economic growth rate, or agricultural growth rate of a country? What form can this connection take, what is expected to happen with the growth rate of the agricultural sector when its share in GDP decreases, or what is expected to happen with the growth of agriculture when economic growth slows down, when the weight of the agricultural sector increases in GDP or when the per capita income of the population increases?

This lack of knowledge makes it difficult to predict changes in agricultural growth as other indicators change; it prevents us from judging realistically whether the performance of the agricultural sector is what was expected based on the global trend of indicators or relationships between them, in the sense that a country

performs or has performed well or poorly depending on the level of other indicators; this also makes it impossible to make more realistic judgments about the proper use of the country's production capacity and making realistic estimates for missed opportunities, grosso modo, or en block, of agricultural development and beyond. Based on the above problem, the main objective of this study is to empirically assess some of the relationships between the above four indicators, where economic growth in general is presented by the nominal GDP growth rate, net national income per capita is used as an indicator of the economic development of a country, the growth rate or rate of the agricultural sector, and the contribution of this sector to the gross domestic product.

The specific objective of the study is to assess the current position of Albania in the global development background related to these indicators and to assess whether this position is in coherence with expectations according to global the relationships between these indicators. In this sense, we finally want to make it clear that this is not a study of how or how much agriculture or agricultural development affects economic development. It is not a study, therefore, of the ways, instruments or mechanisms of how and to what extent agricultural development conditions economic development as a whole.

2. REVIEW OF LITERATURE

Literature on the role of agriculture in a country's economic development and poverty reduction is abundant. The World Bank notes that in many countries, especially in developing ones, agriculture is a key tool for sustainable development and poverty reduction [18]. Researchers point out that although the agricultural sector contributes to economic growth, the latter reduces the role of agriculture in terms of GDP, [8]. Agricultural development has effects on the rest of the economy especially in the early stages of economic development when it has a significant contribution (share) in national income [3]. Other researchers, such as [5] conducted empirical analysis regarding the role of agriculture in economic development. They analyzed panel data for 62 developing countries for the period 1960-1990 and note that increasing productivity in agriculture is important for economic growth in general; it contributes to over 50% of GDP growth. In addition, increasing productivity in agriculture causes a portion of the agricultural labor force to shift to other sectors and this brings about additional 30% of economic growth [3].

In a local context [12] analyze data on the economy of Zambia and note that the role of agriculture in economic development is significant both in the short and longer term. Various researchers [2] point out that with the advancement of economic development the role of agriculture is expected to be reduced due to the process of structural transformation, as a result of which production and employment fall in agriculture and increase in other non-agricultural sectors.

According to the World Bank, the role of agriculture in economic growth depends on a country's position in the development classification. According to the Bank, countries are classified into 5 categories: countries based on agriculture (with agricultural contribution over 25%), pre-transition countries (with agricultural contribution below 25% but more than 10%), transition countries (with agricultural contribution again under 25 but over 10%), urbanized countries (with employment between 10-25% in agriculture) and developed countries with agricultural contribution and employment below 10% [19]. As argued by [22] economic growth does not necessarily require high GDP growth in the agricultural sector although he points out that there is a positive relationship between agriculture and a country's economic growth.

Other researchers [14] analysed data for India for the period 1970-2013 and found that there is a significant but negative relationship between the contribution of agriculture to GDP on the one hand and GDP per capita on the other. Also they found a reciprocal relationship between agriculture and the GDP.

As [7] points out that poor countries grow faster than richer ones and according to data of the last 20 years developing countries have had much faster growth than developed countries. On the other hand, income growth is expected to be low with the increase in per capita income. Globally, as a result of progress in economic development, there is a tendency of ever reducing contribution of the agricultural sector to the economy, because with increasing income consumers increase consumption of non-agricultural products faster than consumption of agricultural products [15].

In the case of Ethiopia [16] has identified that the growth rates of agricultural production were lower than those of GDP growth. He also estimated that 1% growth in agriculture brings about 0.32% of GDP growth.

Meanwhile [13]) cite economist Myrdal according to whom agriculture is a panacea for economic growth. Analyzing the data for Nigeria for the period 1981-2013 they find that real GDP and agricultural production are in long-run equilibrium. They also find that GDP per capita and the contribution of agriculture to GDP have a positive relationship.

2.1 Research questions

Based on the objectives of the study and the findings from the literature review we build the following research questions:

i.   Is the relative contribution of agriculture to GDP related to per capita income, ie the level of economic development of a country?

ii.   Is the relative contribution of the agricultural sector to GDP related to the speed of economic growth, ie to GDP growth?

iii.   Is the speed of agricultural production growth related to the relative contribution of the agricultural sector to GDP?

iv.   Is the speed of growth of agricultural production related to the level of economic development of a country, ie to GDP per capita?

v.   Is the speed of growth of agricultural production related to the speed of economic growth in general?

Based on the answers to these questions; can we make a grosso modo assessment of the performance of agricultural development based on the share of agriculture in GDP, on the growth rate of agricultural production, or the level of economic development? In relation to these questions we also try to assess Albania's current position in the global as well in a regional context.

3. DATA AND METHOD

3.1 Data

We use secondary data obtained from the World Bank WDI database on comparable indicators concerning the development of different countries. This database contains economic data for more than 200 countries of the world. The data used in the study belong to the year 2018 and include all countries for which there is complete data on the indicators used in the study.

Table 1 below shows the indicators or variables for which data were obtained.

Table 1: Variables, their measurement scale and units of measurement

	Acronym	Measurement scale	Measurement unit
Growth of agriculture sector	AGRIGR	Scale	%

Growth of agriculture sector	AGRIN	Nominal	0=No growth, 1=0-3% growth rate 2=Over 3% growth rate
GDP Growth rate	GDPGR	Scale	%
Contribution of Agriculture sector to GDP	AGRICO	Scale	%
Gross National Income per Capita	GNICAP	Scale	US $
Gross National Income per Capita	GNICAPN	Nominal	1=Low Income country (Up to 996$), 2=Lower Middle income country (996-3895) 3=Upper Middle Income country (3896-12055) 4=Rich country (Over 12055)[1]

3.2 Method

For data analysis in the study we use statistical and econometric methods.

Among the possible statistical methods we use descriptive statistics (means, variance, medians, quartiles) as well as graphical representation. Other statistical methods used are grouping as well as graphical representation. For in-depth knowledge about these methods see [9], [1], [11], [20], or [4].

Among the possible econometric methods we make use of regressive, linear or nonlinear and generally one-factor models. For the two variables Y and X, where Y is the dependent variable and X is the independent variable, the one-factor model would be:

$$Y = f(X) + e$$

In this model f (X) is a one-factor mathematical function that usually can be linear, parabolic, power or logarithmic. The model is evaluated on the basis of data for the two variables using the least squares (OLS) method. An important indicator that is calculated for each model is the coefficient of determination (R2). The coefficient of determination is a number from 0 to 1 and indicates what percentage of the variance of the dependent variable is determined by the factor X. It and serves as an indicator of the predictive power of the model. The larger this indicator is the higher is the predictive power of the model. The prediction of Y or the expected values of Y are calculated by putting in the model instead of X the values for which the expected values of Y should be calculated. The square root of the coefficient of determination (R) indicates the strength of association between Y and X variables.

For more in-depth information on regression models see [10], [6], [21], and [17].

To assess Albania's position between countries or group of countries in the global development spectrum we use a comparative approach.

4. RESULTS

For the year 2018, the gross national income per capita of Albania was 4860 US $, or 13320 PPP US $. Based on Table 2 below, with this income level it is located between the median and the first quartile, ie between 25% of the median income countries and the first quartile, or 89th in the global ranking of 192 countries. Albania has a better position in terms of economic growth with 4% growth rate, being positioned in 25% of the countries between the median and the third quartile. Regarding agricultural growth, it is positioned in the third quartile, being thus in 25% of the countries with the best agricultural growth. Regarding the contribution

of agriculture to GDP, with its level of 18% it is located in 25% of the countries with the highest percentage of contribution, or globally in position 42 among 192 countries.

In this comparative context, its level of economic development is low (as per capita income) and its contribution of agriculture to the GDP is huge.

Table 2: Main descriptive statistics

Variable	Mean	Minimum	Q1	Median	Q3	Maximum	Albania
GNICAP	14146.1	280	2020	5670	17350	83580	4860
GDPGR	3.651	-3.100	1.900	3.700	5.000	10.900	4.0
AGRI	2.013	-5.400	0.400	2.100	3.400	8.700	3.4
AGRICO	10.362	0.000	2.000	6.500	15.000	60.000	18

Source: WDI: 2018, calculations by the authors

For the Balkan region, as the table below shows, Albania has the lowest incomes in the Balkans after Kosovo, and it occupies the second place in the Balkans after Kosovo in terms of economic growth in general, and has the best agricultural growth in the region. But it ranks first in terms of agriculture's contribution to GDP at 18%. The second closest country (however far from it) is Kosovo with 8%, while the country with the lowest level of contribution is Slovenia with 2% followed by Croatia with 3%. Even in this regional comparative perspective, the relatively low level of economic development of Albania is quite obvious and the role of agriculture in terms of its contribution to GDP is immense.

Table 3: Data for the Ballkan Countries for year 2018

GNICAP		GDPGR	AGRIGR	AGRICO
Non EU countries				
Albania	**4860**	**4**	**3.4**	**18**
Bosnia&Herzegovina	5690	2.9	-0.1	6
Kosovo	4230	4.2	0.4	8
Northern Macedonia	5450	3	0.5	7
Montenegro	8400	2.9	1.9	7
Serbia	6390	3.2	-0.4	6
Average	**5836.7**	**3.37**	**0.95**	**8.67**
EU countries				
Croatia	13830	1.2	-1.6	3
Greece	19600	-0.9	-0.3	4
Bulgaria	8860	3.3	-1.8	4
Romania	11290	3.6	0.2	4
Slovenia	24840	1.7	1	2
Average	**15684**	**1.78**	**-0.5**	**3.4**

Source: WDI: 2018

As the data in Table 4 show Albania is part of the group "Upper Middle Income Countries". Economic growth in general and the growth of agriculture in particular are better than the average of these countries, but Albania's per capita income is much lower, or several times lower than their average.

Table 4: Average of selected indicators by GNI per capita as defined by WB

	GDPGR	AGRIGR	GNICAP
GNICAP			
1=Low Income country (Up to 996$)	4.73	3.02	634.0

2=Lower Middle income country (996-3895)	4.87	3.10	2327.8
3=Upper Middle Income country (3896-12055)	3.87	2.02	6833.0
4=Rich country (Over 12055)2	2.62	0.62	35891.0
Total	3.65	2.01	14146.1
Albania	4	3.4	4860

Source: WDI: 2018

If we calculate the main descriptive statistics for the group "Upper Middle Income Countries" (54 countries), which includes Albania, we would have the results as in Table 5.

Table 5: Main descriptive statistics for AGRICO group (10-19)

	Mean	Med	Q1	Q3	Max	Albania
GDPGR	3.88	3.6	2.75	4.95	9.5	4
AGRIGR	2	2	0.38	3.4	6.5	3.4
AGRICO	7	7	4.75	9.25	18	18
GNICAP	6190	6190	4925	8170	12050	4860

Source: WDI: 2018, Authors calulations

Regarding economic growth, Albania is slightly above the average and median of the group, but far from 25% of the best countries (4.95) and certainly far from the maximum (9.5%). Regarding agricultural growth, it is in the group of 25% of the best countries but somewhat far from the maximum of the group. Regarding the percentage of agricultural contribution, Albania is at the highest level of the group of 18%. Regarding per capita income, Albania is part of 25% of the countries of the lowest income group, with about 2.5 times lower than the maximum of the group (Mauritus). This group also includes countries such as Northern Macedonia, Bosnia & Herzegovina, Nigeria, Moldova, etc.

In Table 6 we present the grouping of countries by per capita income, as well as the average levels of the analyzed indicators. It is noticed that Albania is part of the group of countries with incomes from 1000 thousand up to 10999 $. This group has a lower average income than Albania, economic and agricultural growth it has faster, while the contribution of agriculture in the worst position. The large difference of the contribution in percentage units of agriculture in the economy of Albania with the average of these countries is noticeable (about 6 times higher).

Table 6: Average of selected indicators by groups of GNI per capita

GNICAP	GNICAP	AGRICO	GDPGR	AGRIGR
<1000 or (blank)	634.00	24.10	3.38	2.78
1000-10999	4450.40	11.45	4.36	2.58
11000-20999	15846.67	2.79	2.93	0.80
21000-30999	25350.00	1.55	1.85	0.19
31000-40999	32750.00	1.00	1.37	0.60
>41000	55915.38	2.00	2.98	0.73
Total	14146.10	10.40	3.65	2.01
Albania	4860	18	4	3.4

Source: WDI: 2018, Authors calulations

In Table 7 we show the grouping of countries by agricultural contribution to GDP and the average levels of indicators by contribution groups. We find that the group of countries where Albania is located has an average

economic growth better than Albania (4.33%) but somewhat lower agricultural growth than Albania (2.99%).

Table 7: Main selected indicators by groups of AGRICO

AGRICO (%)	GDPGR	AGRIGR	GNICAP
<10 or (blank)	3.03	1.20	21337.9
10-19	4.33	2.99	4271.3
20-29	5.46	3.43	1176.4
30-39	3.98	3.19	1180.0
40-49	5.10	3.60	600.0
50-60	6.00	5.50	500.0
Total	**3.65**	**2.01**	**14146.1**
Albania	**4**	**3.4**	**4860**

Source: WDI: 2018, Authors calulations

In the group where Albania is located (10 -19) there are 40 countries. The specific calculations of the main descriptive statistics for this group are as shown in Table 8. As this table shows, in terms of economic growth Albania is below the group average and median (between the median and the first quartile) and far from the best group level (7.8%). Regarding agricultural growth, Albania is slightly above the median and the average of the group, but still far from the highest level in the group. Albania is at the maximum level of the group in terms of the contribution of agriculture to GDP. In terms of per capita income, Albania is above average and above the third quartile of the group.

Table 8: Main descriptive statistics for AGRICO group (10-19)

	Mean	Med	Q1	Q3	Max	Albania
GDPGR	4.3	4.3	3.4	5	7.8	4
AGRIGR	3	3.2	1.95	3.98	7.9	3.4
AGRICO	13	12	11	15	18	18
GNICAP	4371	3230	2105	4382	44860	4860

Source: WDI: 2018, Authors calulations

The main descriptive statistics for this group (with 80 countries) are shown in the following table:

Table 10: Main descriptive statistics for GDPGR group (2.9-4.9)

	Mean	Med	Q1	Q3	Max	Albania
GDPGR	3.83	3.9	3.4	4.3	4.9	**4**
AGRIGR	2.26	2.2	1.3	3.38	6.5	**3.4**
AGRICO	10.29	7	3	13.25	47	**18**
GNICAP	11452	5450	2000	14670	80340	**4860**

Source: WDI: 2018, Authors calulations

According to Table 10, Albania has the best average growth rate in the group, but its growth is between the median and the third quartile, so it is not part of the quartile of countries with better economic growth. Moreover, its growth is somewhat far from the maximum (4.9%) of the group. In this group, Albania is among the countries that make up 25% of the countries with the highest agricultural growth, but it is also part of the quartile of the countries with the highest contribution of agriculture in the group. In terms of per capita income, Albania is at low levels, as it is located in the quartile of countries with income above the first quartile but lower than the median. In the following we analyze the relationships between 4 variables (indicators). For this we use two ways: the first way, based on aggregate data with groups (Table 6), where we construct and analyze graphs of pair relationships. These graphs clearly present the relationships between the variables (indicators)

because through the grouping and averaging of data the effect of exogenous or random variables that affect the size of the indicators is eliminated to a significant degree. The second way consists in constructing and analyzing graphs of pair relationships based on individual country data. The effect of exogenous or random variables is also strongly reflected in these graphs. In each case we evaluated the best possible form of relationship (linear or nonlinear).

Figure 1 shows the dependence of agricultural sector growth on the share of the agricultural sector to GDP. There seems to be a strong but nonlinear relationship between these two indicators that is shown by the coefficient of determination R2 = 0.919. The growth of the agricultural sector is rapidly declining while the contribution of agriculture to the economy is increasing. According to the regression model of the relationship shown on the graph, for every 1% increase in the contribution of agriculture to the economy, an additional 0.85% of agricultural growth is expected. If the contribution would increase 2 times then it is expected that the growth rate of the agricultural sector will increase by 0.854 times. Calculations show that in the case of Albania with 18% contribution of agriculture, according to the model was expected an increase of the sector of 2.64%, which is lower than the actual growth realized (3.4%). This is a positive result.

Figure 2 also shows that the correlation between the two indicators is positive, but weaker, because the indicators are not averaged according to the income per capita groups. According to this graph, with the increase of agriculture share to GDP by 1% it is expected that agriculture growth rate will increase by 0.093%. Or, approximately, an increase of agriculture share to GDP of 10% is accompanied by an increase of agriculture growth rate of almost 1% (exactly 0.93%). These results show that countries where agriculture is more dominant are characterized by faster growth of the agricultural sector.

Figure 3 shows that, assuming a linear relationship, between the growth of the agricultural sector and economic growth in general there is a strong positive correlation, so countries with higher GDP growth are expected to have faster growth of the agricultural sector as well. For every 1% GDP growth a slower growth of the agricultural sector of only 0.822% is expected.

Figure 3 shows that, assuming a linear relationship, between the growth of the agricultural sector and economic growth in general there is a strong positive correlation, so countries with higher GDP growth are expected to have greater growth of the agricultural sector as well. For every 1% GDP growth a slower growth of the agricultural sector of only 0.822% is expected.

According to Figure 5, which was built based on the analytical database, the relationship between agricultural sector growth and economic growth in general is approximately linear.

Figure 6 shows the relationship between agriculture growth rate and per capita income. The regression model shows that higher income countries tend to have lower growth of the agricultural sector. For every 1% increase in per capita income, the growth of the agricultural sector is expected to decrease by 0.6%. According to the model, for Albania whose per capita income is $ 4860, agricultural growth was expected to be 1.79%. In fact the increase has been greater, 3.4%.

The model built with analytical data shows more or less the same, except that for every 1% increase in income per capita, agricultural growth is expected to decrease by 0.68%.

Figure 8 shows approximately the same as Figure 6 that with the increase in per capita income the growth of the agricultural sector also falls, but even faster, not linearly, ie faster and faster. So we find that with the

increase of per capita income, ie with the development of a country, the decline of the agricultural sector is faster than the economic decline in general. For Albania with a per capita income of $ 4860, the growth of agriculture according to the model was expected to be 3.4%, as much as it actually was.

Figure 1: Relationship between AGRICO dhe AGRIGR based on aggregate data


$y = 0.8545\ln(x) + 0.1723$
$R^2 = 0.9198$
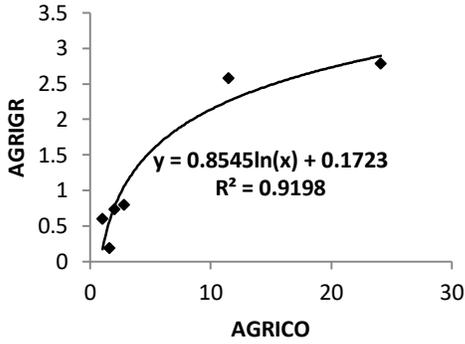
Figure 2: Relationship between AGRICO dhe AGRIGR based on individual data

$y = 0.0932x + 1.0126$
$R^2 = 0.1837$
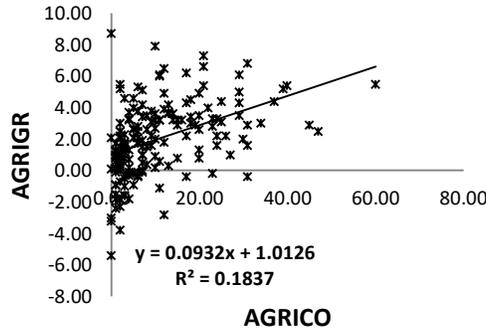
Figure 3: Linear relationship between GDPGR and AGRIGR based on aggregate data

$y = 0.8229x - 1.0336$
$R^2 = 0.6376$
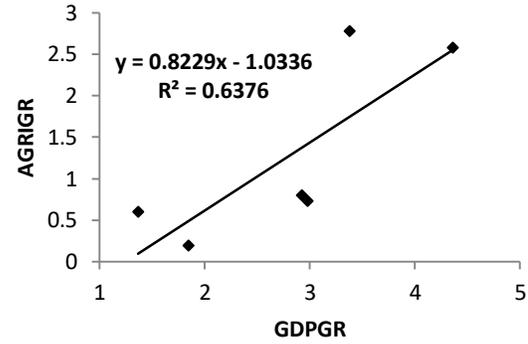
Figure 4: Polinomial relationship between GDPGR and AGRIGR based on aggregate data

$y = 0.2085x^2 - 0.3503x + 0.4161$
$R^2 = 0.6765$
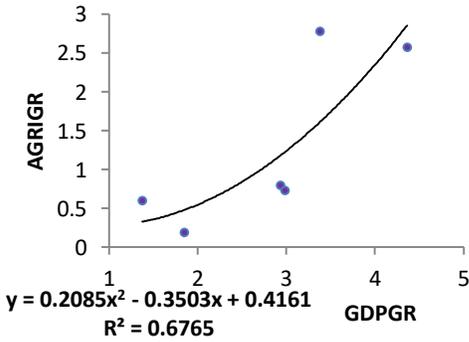
Figure 5: Relationship between GDPGR and AGRIGR based on country individual data

$y = 0.0016x^2 + 0.5972x - 0.3123$
$R^2 = 0.3222$
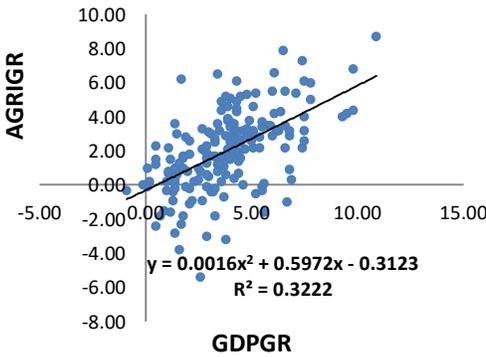
Figure 6: Relationship between GNICAP and AGRIGR based on aggregate data

$y = -0.6\ln(x) + 6.8826$
$R^2 = 0.8018$
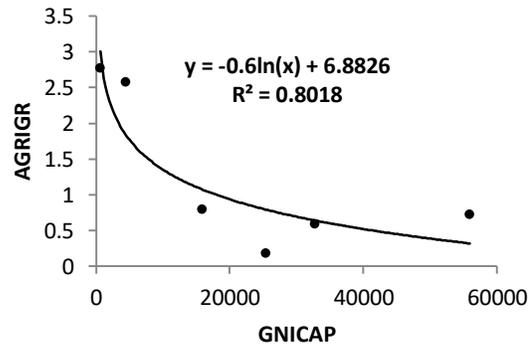
Figure 7: Relationship between GNICAP and AGRIGR based on individual data

$y = -0.685\ln(x) + 7$
$R^2 = 0.1658$
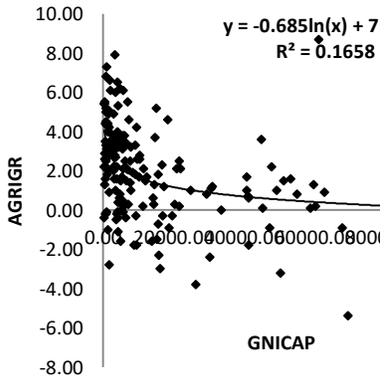
Figure 8: AGRIGR by GNICAP group based on WB classification

$y = 4E-09x^2 - 0.0002x + 3$
$R^2 = 0.9775$
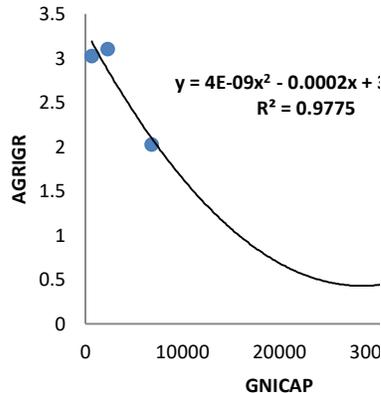
Figure 9: Relationship between AGRICO and GNICAP based on aggregate data

$y = 2670.2x^{-0.707}$
$R^2 = 0.8816$
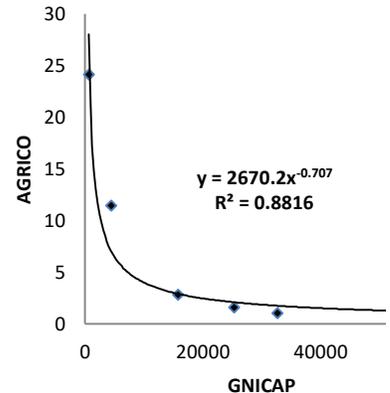
Figure 10: Relationship between AGRICO and GNICAP based on individual data
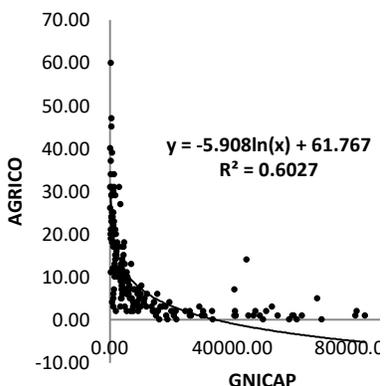
**Figure 11: Relationship between GDPGR and AGRICO based on aggregate data**
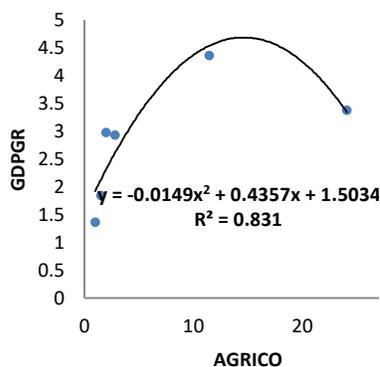
**Figure 12: Relationship between GDPGR and AGRICO based on individual data**
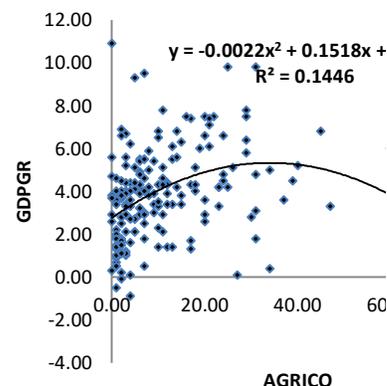
As Figure 9 shows, with the increase in per capita income, the contribution of the agricultural sector to GDP tends to decrease, otherwise high-income countries tend to have a lower contribution of the agricultural sector to GDP. For example, as calculations show, if a country has an income of $ 5,000, the contribution of $ 1,000 of income is expected to lower agricultural contribution by 0.82%. According to the model, for Albania with income of 4860 dollars, it was expected that the contribution of agriculture to GDP would be 11.7%. This is less than the year 2018 level of 18%. This result is negative for Albania.

Figure 10 shows more or less the same, only here the model is semi-linear. According to this model, if per capita income increases by 1%, the contribution of agriculture to GDP is expected to decrease by 0.059 times or almost 0.06%, or otherwise, if income will increase by 100%, the contribution of the agricultural sector is expected to decrease by 5.9%.

Figures 11 and 12 show, albeit with some difference between them, that the relationship between economic growth and the contribution of agriculture to the economy is strong but not linear (it seems parabolic). According to Figure 10, an increase in the share of agriculture of up to 14-15% is associated with an increase in GDP, or countries with share of agriculture values of up to 14-15% tend to have increasing values of economic growth rate, while countries with share of agriculture values above 14 -15% tend to have lower GDP growth rates. According to the model, for Albania with an agricultural sector share of 18%, economic growth was expected to be around 4.8%. This is a negative result for Albania because its economic growth has been only 4%.

Figure 13 simply shows the rapid increase in per capita income as a country moves from the lowest to the highest categories of countries as ranked by the World Bank.

Figure 14 shows that with the increase of a country's development level (based on per capita income) the rate of economic growth according to a nonlinear relationship is low, so economic growth generally falls faster than proportionally while income is growing. According to the model, for Albania with a per capita income of $ 4860, economic growth was expected to be around 5%.

Figure 13: Average of GNICAP by GNICAP group   **Figure 14: GDPGR sipas GNICAP group**

(based on WB classification)

(based on WB classification)

$y = 161.46e^{1.3185x}$
$R^2 = 0.9926$

634 2327.8 6833 35891

1=Low Income country (Up... 2=Lower Middle income... 3=Upper Middle Income... 4=Rich country (over 12055)

4.87 $y = 3E\text{-}09x^2 - 0.0002x + 5.0143$
$R^2 = 0.9691$

4.73
3.87

2.62

GDPGR

GNICAP
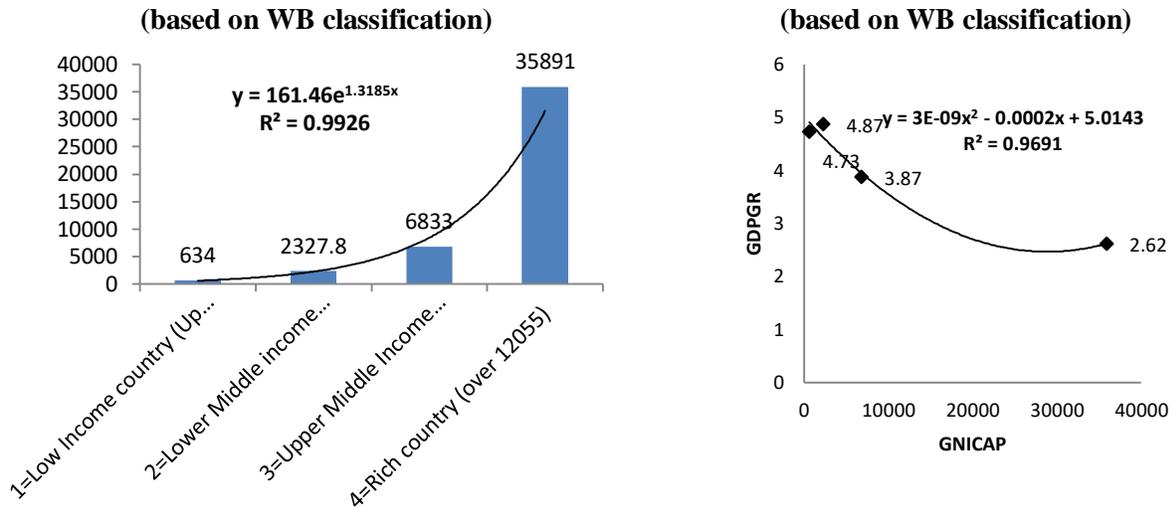
5. DISCUSSION

The study focuses on a global scale analysis of empirical relationships between economic growth, agricultural growth, the contribution of agriculture to the GDP, and national per capita income. In this perspective, its special focus is the assessment or justification of Albania's position in these global relations based on its specifc levels for these indicators. The study found that with the increase in per capita income, the contribution of the agricultural sector to the GDP tends to decrease, otherwise high-income countries tend to have a lower contribution of the agricultural sector to GDP. This finding is also the answer to the relevant research question (i). This result also confirms the finding from the literature (Singariya and Sinha, 2015; Susilastuti, 2018). If for a country the income increases from 5000 to 6000 dollars, it is expected that the contribution of agriculture will decrease by 0.82%. For Albania with income of 4860 dollars, it was expected that the contribution of agriculture to the GDP would be 11.7%. This is much less than the current level of 18%, which is considered a negative result. In response to question (ii) the analysis showed that the relationship between economic growth and the contribution of agriculture to the economy is strong, but not linear (Figure 11). On the other hand, the literature emphasizes that the role of agriculture in economic growth is more evident in the early stages of economic development [3]. The result is partly in line with the literature which simply underlines that economic growth tends to reduce the contribution of agriculture to the economy [8]. More specifically, countries with contribution values up to 14-15% tend to have increasing values of economic growth, while countries with contribution values above 14-15% tend to have lower GDP growth rates. For Albania, with a contribution of the agricultural sector of 18%, economic growth was expected to be 4.8%, which is considered a negative fact because economic growth in 2018 was 4%.

Econometric modeling (Figure 1) showed that there is a strong correlation between the contribution of agriculture to GDP and the growth rate of agricultural production. This is also the answer to the research question (iii). According to the model, in the case of Albania with 18% contribution of agriculture, in 2018 was expected an increase of the sector of 2.64%, which is lower than the actual growth realized (3.4%), which is a positive result. According to the Figure 2 model an increase of agriculture share of 10% is associated with an increase of agriculture growth rate of almost 1% (exactly 0.93%). These results show that countries where agriculture is more dominant are characterized by faster growth of the agricultural sector.

Considering research question (iv) econometric modeling showed that higher income countries tend to have lower agricultural sector growth (Figures 6 and Figure 7), which is also consistent with the findings from the literature [7]. According to the model, for every 1% increase in per capita income, the growth of the

agricultural sector is expected to decrease by 0.6%. An alternative result is obtained on the basis of Figure 8, which shows that with the increase in per capita income, ie with the development of a country, the agricultural sector tends to decline. According to the estimated model for Albania the growth of agriculture was expected to be 3.4%, as much as it has been in fact.

In response to the research question (v), the study showed (see Figure 4) a nonlinear and strong relationship between GDP growth and the agricultural sector growth. In the case of a single country (Ethiopia) the literature shows that the relationship between these indicators is negative [16]. But [13] have found that there is a long-term equilibrium between these indicators. Whereas according to [22] the correlation is positive. According to our model, if the GDP increases from 3 to 4% then the agricultural sector is expected to grow by almost 1.1%, ie faster than the GDP growth. If the economic growth of Albania in 2018 was 4% then according to this model agricultural growth would be 2.3%. In fact, the growth of agriculture has been 3.4%, which is better than expected according to the model. The relationship between these indicators can also be considered approximately linear (Figures 3 and 5).

The study clarifies that, globally, in terms of per capita income and the contribution of agriculture to GDP, Albania is between the first quartile and the median, which we consider as its bad position, while in terms of economic growth and agriculture it is between the third quartile and the median, which is a good position. In the Balkans context Albania is ranked second in terms of economic growth (after Kosovo) and in the penultimate level in terms of per capita income, passing only Kosovo. Albania is also first in agricultural growth but in the worst position regarding the contribution of agriculture to GDP with 18%, well away from the second country (Kosovo) and far from all countries in the region that are members of the EU.

According to the World Bank classification, Albania is part of the group of upper middle income countries. In this group it has almost the same economic growth as the group average and median, economic and agricultural growth are between the third quartile and the median, but it occupies again a bad position in terms of per capita income, with about $ 2000 less income, and in the worst (highest) position regarding the contribution of agriculture to the GDP.

In the income-based grouping (Table 6) Albania is between 1000 to 10999 dollars. In this group it has lower economic growth but higher agricultural growth rate than the group average, higher percentage of agricultural contribution and lower per capita income than average.

The study shows that regarding the share of agriculture in GDP (Table 7) Albania is in the group from with values from 10 to 19%. In this group it has lower economic and agricultural growth than the group average and income comparable with that of more than half of the countries. Regarding per capita income it is positioned among the quartile of the countries with the best incomes in the group. Meanwhile, regarding the contribution of agriculture with 18% puts it back in the worst position.

As the study indicates, Albania has incomes more than twice lower than the group average, contribution about 8% higher than the group average, while its agricultural growth is better than the group average with about 1.2 % higher. Globally the differences in per capita income are even greater. If we look within this growth group, Albania's per capita income is lower than the income of more than half of the countries in the group (about 80 countries), while in terms of economic growth it has an increase almost equal to half of these countries. In terms of agricultural growth it is among 25% of the group countries (20 countries) with the best growth and about 2.1% lower than the best country. Even in terms of the share of contribution, it is among the quartile of the countries with the highest contribution, however far from the maximum level of 47%.

The study showed that with the increase in per capita income, the speed of economic growth decreases according to a non-linear trajectory, so economic growth generally falls faster than proportionally with income growth. For Albania with per capita income of $ 4860, economic growth in 2018 was expected to be over 5%.

6. CONCLUSIONS

This study focuses on the empirical relationships between economic growth, agricultural sector growth, agricultural sector contribution to the economy, and national per capita income. Assessing Albania's position in this complex context of connections was also the special focus of the study. For this purpose, cross-country (over 180 countries) were analyzed for the above indicators, using descriptive statistical methods, graphical presentation and econometric modeling. The study concludes that there are important empirical relationships between these indicators, beyond which stand important factors of economic, social, political, institutional, natural, etc. character, which determine these relationships. But it was not the object of the study to identify and analyze the effects of these factors.

The study concludes that the high contribution of agriculture to GDP is a factor that positively affects economic growth, but at the early stages of development and when the contribution is up to about 15%. If it were higher it would have a negative effect on the economic growth. This contribution tends to have a positive impact on the growth of the agricultural sector but however at a rapidly declining rate. Given the weight of this contribution, in the case of Albania economic growth could be greater than 4%. The other conclusion is that the increase in per capita income tends to reduce the growth of agriculture as well as its role in the economy. The study concludes that Albania has good economic and agricultural growth (globally it is between the third quartile and the median) but a very bad position in terms of per capita income, with about $ 2000 less income and in the worst position (ie most high) regarding the contribution of agriculture to the GDP. It was expected that according to the level of per capita income, economic growth would be higher than 4%. Economic growth is positively related to the growth of the agricultural sector but it is inelastic.

The study showed that with the increase in per capita income, the contribution of the agricultural sector to GDP tends to be low, or otherwise, high-income countries tend to have a lower contribution of the agricultural sector to GDP. The study concludes that with the development of a country, the decline of the agricultural sector is faster than the economic growth in general. These results show that countries where agriculture is more dominant are characterized by faster growth of the agricultural sector.

The results of the study emphasize the importance of increasing labor and land productivity in agriculture as a factor for increasing agricultural production, reducing the relative contribution of agriculture to GDP, increasing incomes, increasing other sectors, because increasing productivity frees agricultural work, as [5] and [3] argue, and promotes the growth of sectors that rely on the agricultural sector such as agro- processing, tourism, agricultural trade, etc. To enable this, effective policies are needed, starting with the promotion of new technologies and techniques, and innovation, to improve the efficiency of the use of production resources (especially land, water and agricultural inputs) and access to markets.

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