

## USE OF AGRICULTURAL POTENTIAL FOR ECONOMIC RECOVERY/GROWTH

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### Abstract

*In the current context, after a pandemic that has left traces in all socio-economic fields and during major geo-political problems, Basic research is needed in order to identify directions for rapid and sustainable socio-economic recovery. The agricultural sector has played a particularly important role in speeding economic growth and development in less developed countries. As a result, we may argue that the agriculture sector has aided these countries' integration into global trade. The proposed paper aims to identify the degree of dependence of the Moldovan economy on agriculture and how this dependence can be transformed into a challenge that will help the country's economy. Also, the paper aims to identify the link between agricultural production and gross domestic product at the level of the Moldovan economy, as well as the need to create a stability in the labour market in agriculture. The above mentioned will be achieved in the conditions in which there is already a decrease in the labour force, a decrease due to medical, geo-political and migration factors. To develop a sustainable economy, sustainable agricultural public policies must be enacted, resulting in the attraction of personnel from metropolitan regions (where unemployment is higher) to rural areas.*

**Key words:** agricultural, Lewis's theory, human development, labour, employees, investments

### INTRODUCTION

The current economic context can be an opportunity for developing countries to find effective ways of recovering the agricultural sector.

The surplus theory, based on Arthur Lewis' 1954 work, is a viable growth model. In the Lewis model, economic growth is closely linked to the cheap labour market attracted to the industrial sector, which leads to increased value added and thus increased investment volume. Thus, Arthur Lewis introduced the dual sectoral model, or the Lewis model. This model combined an analysis of the historical experience of developed countries with the central ideas of classical economists. This integrated approach led to the production of a broad picture of the development process [8], [7], [2], [15].

If we report to of the subsistence economy, there is an "unlimited" labour market, which

means that the capitalist sector can expand without the need to raise wages. This leads to higher profits that are then reinvested in the accumulation of capital. Increasing employment, according to the analysed model, can be a modern approach from an economic point of view, as the process becomes self-sustained.

Obviously, with the increase of the productivity of labour in agriculture, the socio-economic life of the human resources involved in this activity will be improved. This improvement in quality of life will be achieved by increasing wages according to conventional growth models [1], [16].

If one avoids the limitations of Lewis' approach and reflects on the variations in his models, one can develop a pragmatic approach aimed at accumulation and trade as historical and contemporary issues and at the fundamental role that agriculture plays in development.

It can therefore be said that the limits of the use of the Arthur Lewis model today are given by the fact that one cannot speak of an increase in population, but by a reduction in it and the present economic and political actions. This limit, however, can be exceeded because there is still a substantial amount of idle labour in rural areas.

Looking at the importance of agriculture in the GDP of several industrialized countries, there is a downward tendency. Agriculture is also more developed in impoverished and developing countries than in developed countries.

The EU-27 Economic Accounts for Agriculture have fluctuated over the past four years (according to Eurostat): from EUR 418,873.74 million in 2019, we have in 2020 the value of EUR 415,220.66 million, in EUR 2021 449,937.73 million to have EUR 536,648.83 million in 2022. Thus, there may be visible growth in 2022, indicating that U27 has taken economic measures to support this branch of industry [5], [4], [3].

The agricultural sector is critical to the economy of the least developed and developing countries, accounting for a considerable portion of GDP (about two-thirds). At a time when agricultural income makes for a significant share of GDP, it goes without saying that agricultural enterprises are among the top jobs. These companies employ a significant proportion of the workforce that exceeds 50% in most cases. The agricultural sector is also the sole source of livelihood and income for more than half the population of developing countries. The close upstream and downstream links that exist in the rural sector as well as with other sectors of the economy also have a stimulating effect on growth and revenue generation. It is clear that poor countries cannot make progress in economic development, poverty reduction and greater food security without adequate human resources and adequate productive capacities. In light of the foregoing, we can conclude that agriculture should be a top priority for governments in developing countries. All agriculture (including agricultural output and the food sector) must be prioritized in the implementation of all countries' economic

recovery and growth programs. This need has been all the more visible in recent years when the world has undergone major changes and it has been observed that food safety is an essential element in global geo-political stability.

In this context, the purpose of this paper is to analyze in what measure the Moldovan economy depends on agriculture and how this dependence to be transformed into a chance for sustaining the country's economy. The connection between agricultural production and gross domestic product was analyzed in order to find solutions for a stable labour market in agriculture.

## MATERIALS AND METHODS

The proposed methodology analyses the degree of dependence of the main economic field that influences the income of a less developed country. This level of reliance cannot be assessed without considering the influence of the level of employment in the industry in issue. The proposed analysis begins with a look at the relationship between GDP and agriculture. The next step is the analysis of the impact of human resources on agriculture. The regression method is generalized by the theory of the "general linear model", in which several dependent variables are allowed simultaneously and also factorial variables that are not linear independent. Econometric analysis of the model involves identifying regression that includes both dependent and independent variable. For the analysis carried out in this paper, the dependence variable is GDP and the independent variable is agricultural production. The correlation matrix will also be run to confirm the relationship between variables.

The problem of estimating prediction errors will be dealt with the presentation of the general model that involves defining the equation related to the linear model. By applying the method of the smallest squares, the coefficients  $a$  and  $b$ . The estimated value, however, is an average. Accuracy depends on how well the regression right fits with the

actual data. This match is evaluated using the standard estimate error.

Regression analysis helps to understand whether the two variables identified are associated and their degree of association. The correlation coefficient is denoted by "r" and has values from "-1" to "+1". A null value indicates no association. If the correlation coefficient has a value of "+1" it indicates a perfect positive association. If the correlation coefficient has the value "-1" it indicates a perfect negative association.

The correlation coefficient is defined by:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{(\sum (x_i - \bar{x})^2)(\sum (y_i - \bar{y})^2)}} \quad (1)$$

Because R tends to exaggerate the link between x and y, R<sup>2</sup> is the square of the multiple correlation coefficient.

The link of GDP to agricultural revenue in the Republic of Moldova for the period 2015-2020 will be examined using this methodology. The information was acquired from the Republic of Moldova's National Statistical Office.

## RESULTS AND DISCUSSIONS

Moldova's economy has an unstable structure that does not indicate proper conditions for development. Geo-political conditions have often led to the impossibility of developing a policy that could lead the country in a more favourable direction.

Agriculture continues to be an important sector, although the share of this sector in economic revenues has declined over the past decade. It is characterized by small, family farms, and their competitiveness is low regarding productivity, product quality and low value added with an important influence of agriculture contribution to export and GDP [11, 12, 13].

However, even under these conditions, Moldova is among countries where the agricultural sector accounts for the highest proportion of GDP.

Agriculture has the potential to preserve its current value position because the country has products that can compete in any overseas

market. The sole requirement is that there is availability to explore this route.

From the point of view of economic performance, Moldova is among the countries with the lowest economic performance if we compare to the average of European countries. This fact is visible tests when we analyse the revenues collected at the state budget.

For this analysis, the information from the period 2015-2020 was collected. The information is obtained from the Statistical Yearbook of the Republic of Moldova and from the databases of the National Statistical Office of the Republic of Moldova.

According to the provisions of the National Statistics Department (NDS) "Moldova 2020", human capital is one of the few resources that can offer the Republic of Moldova a competitive advantage [9], [6]. If we look at the last few years, we can see that the employment rate in agriculture is decreasing, even if the percentage is still important. This can be a negative element for the economy because it will lead to a need for human resources. In a context where all European countries are facing this problem, clear human resource policies are needed to reduce labour migration in particular. Looking at the statistical data, we can see that agricultural labour productivity has increased in the studied country.

Table 1. The evolution of GDP and income from agricultural production in the Republic of Moldova in 2014-2020 (thousands lei)

Years	GDP	Income from agriculture, forestry and fishing
2014	133,481,634	18,568,633.83
2015	145,753,642	18,813,937.43
2016	160,814,564	19,844,093.46
2017	178,880,890	21,472,170.48
2018	192,508,553	19,183,954.81
2019	210,351,082	20,957,310.30
2020	199,733,684	18,708,438.60

Source: [10].

However, this increase remains low if compared to other countries in the region. In the context of the above: Gross domestic product and income from agricultural production, forestry and fishing can be seen from the perspective of their evolution.

Income from agriculture has a significant impact on the economy. This will open up the prospect of enhancing agricultural labor productivity. Using the presented model, we may reach the levers for agricultural development and, indirectly, income growth in a country.

The evolution of the analysed indicators is presented in Table 1.

The evolution of the analyzed indicators: GDP and income from agriculture, can be seen in Figures 1 and 2.

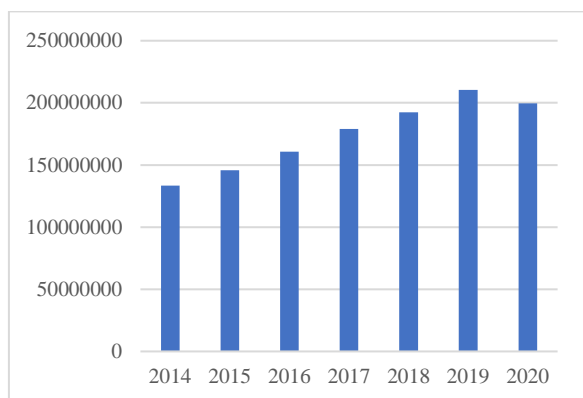


Fig. 1. GDP growth in the period 2014-2020 (Thousand lei)

Source: Own contribution made after the data from [10].

Figure 1 shows the clear picture of the evolution of gross domestic product in the period 2014-2020. Thus, 2019 recorded the highest growth, followed by a decrease in 2020. This decrease may be normal in the economic context specific to 2020.

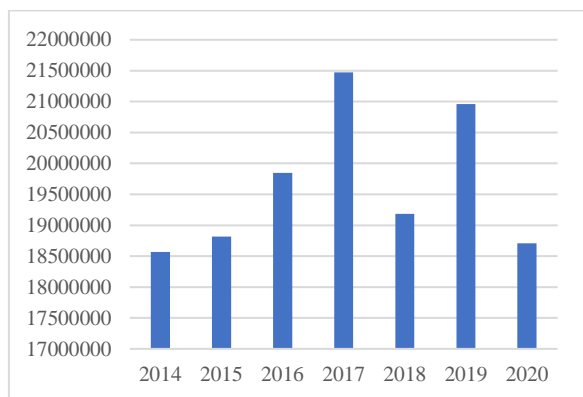


Fig. 2. The evolution of agricultural production revenues in 2014-2020 (Thousand lei)

Source: Own contribution made after the data from [10].

From the point of view of the evolution of incomes from agriculture it can be seen that in 2017 was the peak of the increase in incomes from agriculture, after which there was a decrease that in 2019 there was again an increase followed by a significant decrease in 2020.

Thus, taking into account the information presented in the table above, it is found that the indicators subjected to the analysis varied in the same sense, which is why we can say that between them there is a relationship of dependence. The analysed period 2014-2020 shows a quite important variation in the share of agricultural production in the country's GDP. Thus, in 2014 the share was 13.9%, in 2015 the share was 12.9%, in 2016 the share was 12.3%, in 2017 the share was 12%, in 2018 the share was 10%, in 2019 the share was 10% and in the last analysed year, 2020, the share was 9.4%.

From the data presented above it can be seen that after 3 consecutive years of growth, agricultural production and, respectively, the gross added value generated by this sector decreased (-2%) compared to the previous year due to adverse climatic consequences. The year 2020 had its peculiarities, besides the climate problems were also the problems caused by the COVID pandemic. The decline in agricultural production, which remains one of the main branches of the national economy, usually negatively influences other types of activities. In 2019, according to preliminary calculations of the National Bureau of Statistics (NBS), the gross domestic product amounted to 210 billion lei, with an increase, in real terms, of 3.6% compared to the previous year. In 2020, revenues from agriculture, forestry and fishing contributed 9.4%. In terms of GDP formation.

From the perspective of the impact of agricultural income on gross domestic product, we need to analyze the employment rate of the agricultural workforce. Created on the Lewis model of economic recovery, a system of development is developed that includes important social reforms. Table 2 shows a study of agricultural employment during the last six years.

Table 2. The progression of the number of agricultural workers in Moldova between 2015 and 2020. (thousands of persons)

Years	Number of employees
2015	36,760
2016	36,726
2017	37,603
2018	37,685
2019	36,439
2020	34,214

Source: [10].

In order to identify the typology of the regression function, the graphic representation of the pairs of points that include the values of the Gross domestic product and those of the incomes from agriculture was made. The statistical calculation was done in Excel.

From the point of view of the estimated regression values these are shown in Figure 3 where the right regression is specified and the value of the coefficient of determination  $R^2$ .

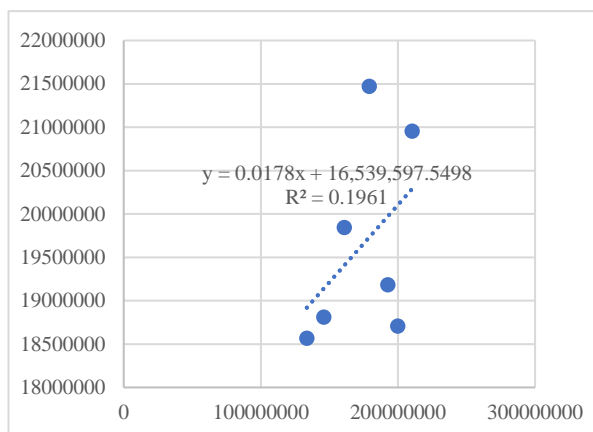


Fig. 3. Revenue from agriculture, forestry, and fishing from 2015-2020

Source: Own contribution using data from Table 1.

The coefficient of determination has been shown to have an exact value equivalent to the square of the multiple correlation coefficient. The purpose of this article is to calculate the degree of dependence between the two variables analysed.

As shown in Table 3, the coefficient of determination is 0.1961. Thus, the value of this indicator shows the degree of dependence of the domestic product but on the income from agriculture.

If there is a direct link between the variables, then the value that is created can be seen if it

is produced directly from the variables. Therefore, it is possible to state that there is a connection, albeit a weak one, between the two variables that were analyzed. This conclusion can be reached despite the fact that the correlation is tenuous.

In this example, the value of multiple R indicates the multiple correlation coefficient (R) of the simple correlation that occurs between x and y. The simple correlation is represented by the value of single R. A conclusion drawn from the value of multiple R's suggests that between 2015 and 2020, the value of GDP in the Republic of Moldova is influenced by the income from agriculture. This positive correlation was obtained based on the value of R.

Table 3. Regression Statistics

Regression Statistics	
Multiple R	0.4428
R Square	0.1961
Adjusted R Square	0,0353
Standard Error	28,245,013.01

Source: Own contribution based on the information in Table 1.

Adjusted R Square is a corrected coefficient of determination with degrees of freedom having the same meaning as  $R^2$ . Standard Error is the standard error that shows how far the observed values  $y_i$  deviate on average from the theoretical values on the right of regression,  $\hat{y}_i$  (in this case  $\pm 28,245,013.01$ ).

As observed from statistical data, agriculture has an important share in the formation of gross domestic product.

We used regression to examine the sort of relationship between GDP and agricultural revenue. The association fence between the examined indicators is determined by the correlation coefficient value (0.4428). Because the relationship between the two indicators studied is positive, it demonstrates that the gross domestic product is dependent on agricultural income. The correlation coefficient can indicate the direction of analysis in order to optimize the income obtained from agriculture. The dependence of the GDP of the Republic of Moldova on the primary sector of the economy is obvious.

In the context of the above, the country under consideration must strengthen its competitive advantage from the point of view of agriculture. Thus, an integrated approach to agricultural reforms is needed, with a focus on investment and research. This approach will lead to an increase in labour productivity and, implicitly, to an increase in agricultural income.

To achieve significant and sustainable levels of growth, governments must strive to increase agricultural productivity while stimulating capital accumulation in all other sectors of the economy.

In light of the foregoing, one can observe the evolution of agricultural employment. As a result, Figure 4 depicts this evolution from 2015 to 2020.

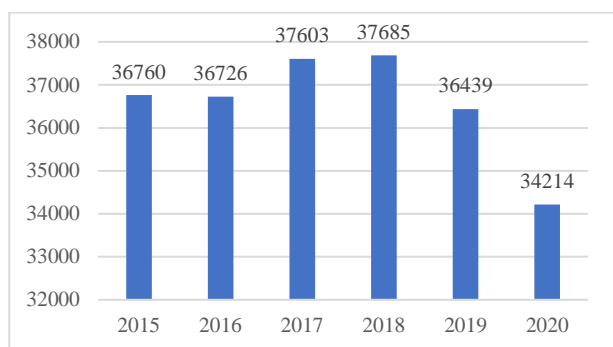


Fig. 4. Evolution of employees number in the field of agriculture

Source: Own contribution using information in Table 2.

The decrease in the number of employees in agriculture can be due both to socio-political causes and the fact that the country's industry has started to develop and the vast majority of available employees have migrated to higher-paid industrial branches. Also, the demographic decline can be a factor that influences economic indicators not only in Moldova and throughout Europe.

National Bureau of Statistics (NBS) projections for the Republic of Moldova predict an almost 49.9% increase in agricultural production worldwide across families of all income levels in 2021 compared to 2020. The worldwide expansion in agricultural output is largely due to a 75.5% increase in plant output. Preliminary projections from the NBS also place agricultural production in all types of

households around the world at 70.2% in 2022. The fall in agricultural output was driven by a 36.8% drop in plant production and a 2.6% drop in animal production over the world. Applying the model described above, it is noted that the economy of the Republic of Moldova is influenced to a large extent by agriculture. However, the major problem of agriculture is the lack of qualified human resources. In this regard, especially in the current economic, political context, where migration is a rather important issue, the capacity to integrate more people into the labour market in agriculture must be stimulated. This can only be achieved by achieving sustainable labour market policies.

The need for coherent and applicable policies is all the more important as unemployment in the first and second quarters of 2020 is much higher in urban areas than in rural areas, which can be a resource for agriculture.

The risks associated with the COVID-pandemic period, The post-COVID period can turn into opportunities in the situation where there will be clear public policy in the agricultural field and the population that is in the urban area and who no longer has a job to be oriented toward the jobs that will be created in the rural area. The limits of using Arthur Lewis' model are given by the fact that one cannot talk about population growth, but only population reduction due to the COVID pandemic, migration, and the political situation in the area, but this limit can be exceeded because population growth is not possible at the rural level. There is still a substantial amount of unemployed labour, and rising global unemployment as a result of the closure of many industrial or service units provides a steady source of labour.

## CONCLUSIONS

The analysis carried out can lead to other models and studies that can create a development infrastructure for the agricultural field. All proposed ideas can be integrated into a common platform leading to the increase of the country's agricultural capacity. This is all the more important as the country currently has a direct dependence relationship

between GDP growth and agricultural income. This means that for every unit increase in agricultural production in the country analysed, GDP increases by 0.91 or a value close to one unit. According to the statement, there is a consistent relationship of dependence. This fact makes us say that agriculture is the driving force of the country's development at the moment, and that public policies in the agricultural field can make a difference, leading the country to economic prosperity.

A development strategy for Moldova 2030 must be established and developed to integrate the 2030 Agenda and, in particular, those sustainable development goals that will be considered priorities and have an accelerated development effect, with a view to increasing the contribution of agriculture to GDP, based on the direct correlation between these two analysed indicators. Even though 2020 is one where incomes could be noticed, there are at this moment the premises for the country to be an important pole in terms of agricultural production.

Moreover, the development of the new national development strategy based on the 2030 Agenda will implicitly involve the integration of the Association Agenda, given that most of the sustainable development objectives are found in the Association Agreement Moldova-EU [8], [14], [17].

The methodology achieved can be improved by adding variables that can influence agricultural production. However, we must bear in mind that agriculture can also extend to the food industry and incomes can increase. This research can take into account the innovative factor in agriculture, as innovation leads to increased labour productivity, which means an increase in agricultural production. A relocation of the human factor between the industrial sectors of a country is a solution to meet human resource requirements. It is also of interest to analyse the share of innovation in agriculture, the costs with this process and the subsequent revenues. The Republic of Moldova has potential for economic growth. It also has products already established in foreign markets. In this regard, the only possibility for agricultural development is to

engage in research and development and to establish clear priorities in this area. You will also attract human capital and implicitly boost productivity by doing so.

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