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FEATURES AND FACTORS OF LABOR POTENTIAL FORMATION IN AGRICULTURE

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Summary. The article researches the formation of labor potential in agriculture and the main factors which affect it. Labor potential is characterized not only by the number of employed people, but also by qualitative characteristics such as education level, professional skills, health indicators and motivation. Especially emphasized the impact of such features of the agricultural sector as seasonality, the predominance of physical labor and the unevenness of the level of mechanization on labor potential. The research analyzes internal factors are considered in the context the framework of human capital theory, and external factors are considered in the context of migration, technological change and demographic processes. Statistics show high levels of employment in agriculture but relatively low labour productivity. As a result, increasing investments in human capital, developing vocational education and applying modern technologies in the agricultural sector are important in order to strengthen labor potential.

Key words: labor potential, agriculture, human capital, productivity, migration

Introduction. The formation of labor potential, especially in agriculture, is one of the key factors ensuring economic development. In Azerbaijan, agriculture remains one of the most significant sectors of the economy. According to official statistical data, approximately 40% of the working-age population is employed in the agricultural sector. However, the share of this sector in gross domestic product (GDP) accounts for only 5.7%, which show the low labor productivity in agriculture and the existence of an imbalance between employment levels and economic contribution.

Explanation for this imbalance is that the reported 40% indicator may not accurately reflect the actual level of employment in agriculture. This figure also includes individuals who own agricultural land but are not actively involved in agricultural production. As a result, there is a need to improve employment indicators and conduct a more in-depth analysis of labor potential. Among the main challenges facing the agricultural sector are low productivity, high dependence on climatic conditions and the use of outdated production methods. In addition, weak cooperation among small farmers and insufficient development of processing infrastructure hinder the effective use of labor resources in agriculture.

In this context, the purpose of this article is to analyze the characteristics of labor potential formation in the agricultural sector of Azerbaijan, as well as the internal and external factors determining this process.

To achieve the stated goal have been defined the following tasks:

- to explain the essence of the concept of “labor potential” in the agricultural sector and to identify its structural characteristics;
- to examine the internal and external factors influencing the formation of labor potential;
- to analyze the current state of labor potential in agriculture, based on statistics and analytical reports;
- to propose measures for the development and efficient use of labor resources in the context of contemporary challenges.

Object and methodology of research. The research object is the labor force working in Azerbaijan's agriculture and its potential.

The subject of research is the processes and factors influencing the formation and development of this potential.

The methodological framework of research is based on a systems approach, which involves analyzing labor potential as a complex system consisting of interconnected components. Also are identified and summarized using analytical and synthesis methods of labor potential. A comparative analytical approach allows for a comparative assessment of internal and external influencing factors. Statistical analysis provides a quantitative basis for employment, productivity, and other economic indicators. In addition, for visualize trends and determine the impact of factors are used expert assessment and graphical analysis.

Analysis and discussion. As is well known, labor potential constitutes an integral component of a country's overall economic potential. This concept is not limited to the quantitative size of the labor force; rather, it includes a set of physical, educational, professional, experiential, and motivational components. The physical component refers to the individual worker's state of health, endurance, level of activity and psychophysiological characteristics.

In addition, the structure of labor potential includes the level of workers' preparedness, professional skills, practical experience and their ability to adapt to changing working conditions and acquire new knowledge. It should be noted, that motivation and experience enhance workers' independence and the effectiveness of their performance, the physical health forms the foundation of labor potential and education and qualifications determine the professional level.

In the process of defining labor potential, it is of particular importance to take into account its fundamental distinction from labor resources. If labor resources are generally understood as a quantitative indicator of the workforce, the labor potential characterizes a broader set of qualitative attributes.

Agriculture, being one of the traditional and strategic sectors of the economy in Azerbaijan, also plays a significant role in the formation of labor resources. The development of labor potential in this sector is accompanied by a number of specific features. These features stem from the nature of the agricultural production process, the structure of the labor market, and demographic indicators.

One of the key characteristics of labor activity in agriculture is its seasonal nature. As a reason of large share of crop production and livestock-related work is seasonal, the demand for labor increases during certain periods of the year and declines during others. This leads to an uneven distribution of employment in rural areas and complicates the stable, year-round utilization of labor resources [7].

In addition, the predominance of physical labor in agriculture is one of the main factors influencing the formation of labor potential. The low level of mechanization in many regions means that most of the work is done manually. As a result, the efficiency of the production process decreases, and the labor productivity of agricultural workers becomes lower than in other sectors of the urban economy.

One of the important factors affecting labor potential is the uneven level of mechanization across regions. In regions with insufficient infrastructure and maintenance, agricultural production is carried out more manually, which increases the physical workload and limits the use of modern technologies. In such conditions, the innovative development of agriculture slows down.

One of the factors weakening the labor potential in agriculture is the migration of the able-bodied population to the city. In recent years, the creation of more attractive employment opportunities in the urban economy has led to the outflow of part of the rural population from the rural economy. This leads to the reduction of labor resources in rural areas, as well as to the uneven formation of the age structure of agricultural workers.

Along with migration, one of the characteristic problems of the rural economy is the aging of the rural population. Since young people increasingly prefer the opportunity to work and study in cities, the average age of rural workers is increasing. This tendency has a negative effect on the quality of labor potential and makes difficult to modernize production.

Another important factor which influences to the labor market in agriculture is the low prestige of agricultural professions. Low profitability, difficult working conditions and limited opportunities for

social security reduce the interest of young people in this field. As a result, increases the need for professional specialists in agriculture.

Along with all these factors, one of the most serious problems observed in this field is the lack of qualified personnel. The lack of specialists who know modern agricultural technologies in various areas of agriculture, possessing innovative approaches, prevents the increase of production efficiency. Bad technical knowledge and professional training reduce quality indicators of labor potential.

Thus, the formation and development of labor potential in agriculture occurs under the influence of numerous economic, social and demographic factors. Seasonality, the predominance of physical labor, differences in the level of mechanization, migration, the aging of the rural population, the low prestige of professions and the shortage of qualified personnel require a comprehensive approach to strengthening the labor potential. The modernization of the material and technical base and the improvement of the quality of human capital have of special importance for ensuring development in this field.

All of the mentioned features make it necessary to study more deeply what factors influence the formation of labor potential. So, for the correct assessment of the real state of the agricultural sector is special importance a systematic analysis of internal and external factors, which influence to the formation of the labor potential.

The internal factors influencing the formation of labor potential include an individual's knowledge and skills, level of education, health indicators, motivation, work experience and personal qualities. One of the founders of human capital theory, **Gary Becker**, in his work "*Human Capital: A Theoretical and Empirical Analysis*", emphasizes that education and professional training constitute the most important types of investment that enhance workers' productivity [1]. Becker's approach can also be effectively applied to the agricultural sector, because the knowledge and skills of workers engaged in agriculture are direct determinants of productivity.

Another prominent economist, **Theodore W. Schultz**, in his work "*Investment in Human Capital*", particularly in the context of agriculture, regards the improvement of people's education and skills as a fundamental prerequisite for economic development [2].

External factors affecting the formation of labor potential encompass a broader socio-economic environment. These include the level of technology, infrastructure development, labor market requirements, state policies, migration processes, population age structure, and climatic and soil conditions. In this regard, one of the most frequently cited scholars is **Ester Boserup**. In her work "The Conditions of agricultural growth: The economics of agricultural change under population pressure", she argues, that population density and pressure on land use are key factors, which form the technological change and labor structures in agriculture. This perspective is particularly important for understanding how external influences affect agricultural labor potential [3].

The impact of rural-urban migration on labor potential is systematically explained in the Harris-Todaro model. Researchers C.R. Harris and M. P. Todaro, in their famous article "Migration, unemployment and development: A two-sector analysis," show that limited employment and low wages in rural areas increase the flow to cities and this process leads to a decrease in labor potential in agriculture [4]. On the other way, the issue of the adoption of technological advances in the agricultural field is explained by Everett Rogers in his work "Diffusion of innovations"; according to his approach, the diffusion of technology begins with "leader groups" and passes to the entire community, and this process leads to a qualitative increase in labor potential [5].

Thus, both internal and external factors exert a multi-layered influence on labor potential development in the agricultural sector. Internal factors are linked to individual worker characteristics and human capital, while external factors arise from the overall economic, technological, and social environment of the sector. Human capital theories of Becker and Schultz support the role of internal factors, while Boserup, Harris-Todaro, and Rogers explain the mechanism of external influences in the agricultural sector. Taken together, these scholars' approaches demonstrate that labor potential development is a complex and interconnected process, and the specific characteristics of the agricultural sector require a more precise understanding of this process.

As is well known, the rural employment rate is considered as one of the key indicators of rural social development. Employment in rural areas has certain characteristics related to the economic conditions of labor. Currently, employment and unemployment remain among the most important socioeconomic issues, and these problems are quite acute. This is due to the fact that agricultural labor is directly tied to the land, and its results are strictly dependent on biological processes. In addition, employment opportunities are limited by the size of the market, demand for manufactured products, availability of raw materials, and other factors.

Table 1

Population dynamics

Year	City places	Rural places
2021	5494,4	4531,7
2022	5502,5	4560,8
2023	5527,2	4599,9
2024	5547,8	4633,0
2025	5562,9	4662,0

Source: The state statistical committee of the Azerbaijan Republic

<https://www.stat.gov.az/>

Despite this, analyzing the population dynamics in urban and rural areas over the past 5 years (Table 1), it can be noted that in 2021–2025, the urban and rural populations grew dynamically, and during this period, a positive demographic trend was observed in both directions. The urban population increased from 5494,4 thousand in 2021 to 5562,9 thousand in 2025, an increase of 68,5 thousand people. Although the growth rate was relatively weak, it remained stable. In rural areas, the population grew at a faster pace: the rural population, which was 4531,7 thousand people in 2021, reached 4662,0 thousand people in 2025, an increase of 130,3 thousand people. Thus, the growth rate of the rural population was approximately twice that of the urban population. A gradual decreasing in the disparity between urban and rural populations can also be observed over time. While this gap stood at 962,7 thousand people in 2021, it had narrowed to 900,9 thousand people by 2025. This trend indicates more intense growth in the rural population and confirms the emergence of a convergence trend in the urban-rural demographic balance. Overall, demographic dynamics for 2021–2025 demonstrate that the urban population is growing slowly and the rural population is growing faster, but stability remains in both directions.

Number of employed population, classification by types of economic activities (at the end of the year)

Table 2.

Year	In the field of economics - total	Agriculture, forestry and fisheries
2020	4721,2	1696,5
2021	4831,1	1732,9
2022	4901,1	1753,1
2023	4963,3	1777,4
2024	5029,8	1782,3

Source: The state statistical committee of the Azerbaijan Republic

<https://www.stat.gov.az/>

A comparative analysis conducted for 2020–2025 shows that both population dynamics and employment indicators demonstrate a parallel trend of growth in the economic and social spheres. The observed differences in the growth rates of the urban and rural populations are closely linked to changes in the labor market. While the urban population grew relatively slowly during this period, the

rural population grew faster. In particular, the increase in the rural population by 130,3 thousand people between 2021 and 2025 indicates an increase in demographic dynamics in rural areas. The increase in the urban population amounted to 68,5 thousand people, reflecting more stable but lower growth rates.

Employment indicators also somewhat complement this demographic growth. Between 2020 and 2024, the number of people employed in the economy increased from 4721,2 thousand to 5029,8 thousand people (an increase of 308,6 thousand people). This indicates an expansion of economic activity and a general revival of the labor market. The number of people employed in agriculture, forestry, and fishing also increased from 1696,5 thousand to 1782,3 thousand people.

The 85,8 thousand people increasing process in agricultural employment confirms that development is parallel to rural population growth. Meanwhile, agriculture's share of total employment has remained relatively stable over the years, fluctuating between 35 and 36 percent. This means that while employment in agriculture is growing, the fastest-growing sectors are non-agricultural ones. Higher growth rates in other sectors of the economy are creating conditions for greater employment opportunities for the urban population.

A comparison shows that, although rural population growth is higher, the structural expansion of the urban economy has become the primary driver of overall employment growth. While there is some correspondence between rural population growth and agricultural employment growth, overall economic growth is driven by non-rural sectors. In result, demographic and labor force indicators for 2020–2025 point to positive trends in both urban and rural areas, an expanding labor market and gradual structural diversification of the economy.

Strengthening labor potential is of strategic importance for all sectors of the economy, especially for the agricultural sector. This requires, first and foremost, increasing systematic investment in human capital. Improving education levels, vocational training, implementing lifelong learning programs and developing innovative skills are key components for strengthening competitiveness in the labor market. Practical vocational education, agricultural courses, training modules based on modern technologies, and the development of digital skills are particularly important for the agricultural sector.

The second direction is related to improving working conditions. A safe work environment that protects workers' health, modernization of technical equipment, increased mechanization and improved regional infrastructure have a direct impact on increasing labor productivity. The use of appropriate technologies not only reduces the burden of physical labor but also creates the conditions for higher worker productivity.

The third direction is the institutionalization of the labor market and strengthening effective governance mechanisms. Improving the availability of employment services, digitalizing databases and developing balanced employment programs across regions create the conditions for more effective utilization of labor potential. In addition, managing labor migration, creating additional jobs for young people in rural areas and promoting innovative entrepreneurship play an important role in developing labor potential.

Conclusion. The analysis shows that labor potential is formed depending not only internal (education, skills, health, motivation), but also external (economic environment, level of technology, infrastructure, demography, state policy) factors. The specific characteristics of the agricultural sector — seasonality, predominance of physical labor, technological backwardness and regional inequalities — intensifies the effect of these factors. As a result, the development of labor potential is not limited to increasing the skills of the individual, but also requires a complex improvement of the socio-economic environment.

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