Assessment of the level of human capital development in the agricultural sector: indicators and their systematization

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Abstract. The paper presents a systematization of indicators of human capital development in the agrarian sector. Three groups of indicators have been identified that allow a comprehensive approach to the analysis of quantitative reproduction of human capital, i.e. social indicators, socio-economic indicators and indicators of development of migration processes. The authors consider human development index (HDI) as a tool for assessing the quality of human capital that characterizes the level of human capital development in different countries and regions of the world, as well as determine the peculiarities of its application, as well as limitations and assumptions of research results obtained with this tool. The criteria have been determined for evaluating the efficiency of strategy being implemented in the agrarian sector. They make it possible to assess the relationship, interdependence and impact of the strategy both on the development of individual components of human capital system and the economy of the Agro-Industrial Complex as a whole. It has been established that state development strategies should be assessed according to their social and economic efficiency.

1. Introduction

Reported literature data analysis [1, 2, 3, 4] shows that the number of indicators being used to study human capital is quite large. In this regard, one of the objectives within the framework of studying the methodological and methodical provisions for the development and implementation of strategy for human capital development in the agrarian sector is the formalization of the system of indicators that provides an assessment of the state, structure, and dynamics of human capital development both at the current moment and in retrospect, as well as a scenario-based forecasting of reality of achieving the goals and objectives set within the strategy.

Based on the essence of “human capital” category and its place in the system of agrarian economy [5, 6, 7], as well as the peculiarities of strategy for human capital development in the agrarian sector [8, 9, 10], we consider it necessary to systematize the indicators characterizing the qualitative and quantitative parameters of human capital reproduction and efficiency of strategy for its development.

It should be noted that the existing methodological recommendations of general and preliminary nature designed to ensure the development of methods for assessing the efficiency of strategy for human capital development in the agrarian sector should be further refined and clarified taking into account the practical experience of drafting and applying the methods for assessing the efficiency of state programs in the Russian Federation [11].
2. Materials and Methods

Within studies on the level of human capital development in the agricultural sector the authors used system, program-targeted and project-based approaches.

The main research method was analytical, which allowed analyzing and generalizing extensive theoretical and empirical material.

When working with statistical information, the statistical and economic method was used.

The authors also used different methods of economic studies, such as comparative method, abstract-logical, method of interpretation, etc.

3. Results and discussion

The choice of development strategy directly depends on the qualitative and quantitative characteristics of human capital reproduction in the agrarian sector. The group of choice indicators is intended, firstly, to analyze the achieved level of human capital development in both absolute and relative terms; secondly, to compare the level of human capital development between territorial entities and countries; and thirdly, to substantiate the target indicators of the strategy for human capital development in the agrarian sector [12].

Taking into account the peculiarities of human capital reproduction in the agrarian sector, we have identified three groups of indicators that allow a comprehensive approach to the analysis of quantitative reproduction of human capital, i.e. social indicators, socio-economic indicators and indicators of development of migration processes.

The group of social indicators characterizes the labor potential of rural areas, which is one of the key characteristics at the time of adoption of state programs for the development of certain industries, as well as investment decisions by individual economic entities. This group should include the following indicators:

- number of inhabitants by categories of settlements;
- population density;
- population structure on a territorial basis;
- number of rural inhabitants by age and sex groups;
- structure of the rural population by level of education;
- natural increase/decrease of the rural population;
- growth rates for the rural population: total growth rate, natural growth rate, true rate of natural population growth;
- reproduction rates for the rural population: gross reproduction rate, net reproduction rate;
- age-specific fertility and mortality rates of the rural population;
- life expectancy of the rural population in general and by gender;
- demographic burden on the rural population of working age;
- number of economically active persons in rural areas, etc.

The group of socio-economic indicators allows, on the one hand, assessing the current state of labor market within a certain territory in conjunction with the economic development of the agro-industrial complex. On the other hand, it allows indirectly estimating the standard of living of the rural population, as well as considering the qualitative characteristics of labor resources involved in production and management processes in the context of industries. These indicators include the following:

- average annual number of employees by types of economic activity;
- average monthly nominal wages of employees in organizations of the Russian economy;
- the proportion of people employed in agriculture in the total number of people employed in the economy as a whole;
- number and structure of the population employed in agricultural sectors by level of education;
- number of unemployed rural population;
- level of unemployment in rural areas;
- size and structure of monetary income and consumer expenditures of rural households;
• real disposable income of the rural population;
• average awarded pensions;
• minimum subsistence level by population categories (below working age, working age, above working age);
• the proportion of the rural population with monetary income below the subsistence level;
• income inequality coefficient;
• wage expenses in production costs and income of agricultural organizations;
• indicators of resource potential (e.g., material and technical, financial, labor) of economic entities;
• indicators of intensity and efficiency of economic activities of organizations in the rural economy, etc.

The group of indicators of development of migration processes is intended for assessing the degree of impact of migration on human capital reproduction in the agrarian sector. It includes the following indicators:
• number of immigrants (number of population that has arrived);
• number of emigrants (number of population that has left);
• coefficient of arrivals/departures within the rural population;
• number, directions, and structure of international migration;
• age and sex composition of migrants;
• net migration (migration growth of the rural population) and accrued net migration;
• coefficient of migration growth, etc.

It should be noted that it would be incorrect to perform a research using only the abovementioned indicators from the perspective of analyzing the external manifestations of human capital development, since these indicators do not reflect the key feature of human capital, which is to bring surplus value to its owner through the use of an individual’s abilities in the process of engaging in labor activities. In this regard, the importance of determining the qualitative characteristics of human capital increases.

Currently, scientists have developed a generally acknowledged tool for assessing the quality of human capital. International practice utilizes a combined indicator, which is called the Human Development Index (HDI) and allows assessing the level of human capital development in individual countries and regions of the world. This indicator is annually calculated by experts of the United Nations Development Programme (UNDP) together with a group of independent international experts, who use statistics from national institutions and international organizations alongside with analytical developments.

The human development index calculation means an assessment of the qualitative aspects of human capital development of different countries in the spheres of health care, education and income of citizens and is conducted through the calculation of such indicators that make it possible to quantify the qualitative aspects. So the HDI can be determined as the geometric average value of the three mentioned below indices [13].

1. Life Expectancy Index (LEI) reflects the level of development of the country’s health system, through the assessment of the average life expectancy at birth (ALEB), as an indicator more exactly reflecting the level of health and longevity of the population.

2. Index of Education Level (EL) characterizes the achievements of different countries in the field of education and means an assessment by two main indicators: the average duration of education of the population and the expected duration of education of the population still receiving education at various levels (primary, secondary and higher) [14].

3. Income Index (II) gives a full understanding of the standard of living, as well as of welfare of the state.

Individual HDI dimension indices are calculated using the following formula:

\[
\text{Index} = \frac{x_t - x_{\text{min}}}{x_{\text{max}} - x_{\text{min}}},
\]
where:
\( X_i \) is the actual value of indicator;
\( X_{\text{min}} \) and \( X_{\text{max}} \) are the minimum and maximum values of indicator.

The Income Index is calculated using the natural logarithm:

\[
II = \frac{\log y_i - \log y_{\text{min}}}{\log y_{\text{max}} - \log y_{\text{min}}},
\]

where:
\( II \) is the Income Index;
\( y_i \) is the actual value of indicator;
\( y_{\text{min}} \) and \( y_{\text{max}} \) are the minimum and maximum values of indicator.

These dimensions are normalized as numerical values ranging from 0 to 1, the geometric mean of which is the aggregated HDI score ranging from 0 to 1. States are then ranked on the basis of this score.

It should be noted that the results of determining the quality of human capital based on the HDI calculation are largely debatable. The objectivity of obtained values is questionable due to a large number of assumptions. In particular, the Life Expectancy at Birth is a predictive indicator and does not reflect the current state of health of the population, as well as the actual age of currently living human generations. Index of Education Level does not allow estimating the quality of education in a strict sense, and a high Gross National Income at purchasing power parity per capita (GNI at PPP) does not yet denote a high per capita income.

Efficiency criteria for the strategy being implemented in the agrarian sector allow assessing the relationship, interdependence and impact of the strategy both on the development of individual components of human capital system and the economy of the national Agro-Industrial Complex as a whole.

The complexity of efficiency criteria for the strategy of human capital development in the agrarian sector is mostly due to the fact that the subject area of human capital research in the agrarian sector lies at the junction of sociological and economic sciences and is further complicated by industry specifics. Therefore, in the process of determining such criteria it is necessary not only to assess the economic effect of implementation of the strategy and its related subprograms, but also to determine their social significance for the rural population. At the same time, the strategy itself must meet two criteria, namely it should be measurable in terms of quantity and quality.

Qualitative assessment assumes that the adopted strategy should be forward-looking, innovative, focused on aligning the qualitative characteristics of human capital with the production needs in a strategic perspective, realistic and beneficial for realizing the potential of the Agro-Industrial Complex.

Quantitative assessment implies the possibility of assessing the efficiency and the degree of achievement of target indicators specified in the strategy.

Currently, the main document that regulates the activities of state administration in terms of adopting state programs is the Decree No. 588 of the Government of the Russian Federation of August 2, 2010 “Procedure for the Development, Implementation and Assessment of Efficiency of State Programs of the Russian Federation” [15]. This document notes that “a prerequisite for assessing the planned efficiency of a state program is the successful (complete) achievement of its target indicators and values of the state program planned for the period of its implementation, as well as measures within the established time frame.”

The following criteria are used as the main criteria for the planned efficiency of implementation of a state program.

1. Criteria of economic efficiency that take into account the assessment of contribution of the state program to the economic development of the Russian Federation as a whole, and the assessment of impact of the expected results of state program on various spheres of economy of the Russian Federation, including the assessment of both direct (immediate) effects of state program implementation and indirect (external) effects arising in the related sectors of economy of the Russian Federation.
2. Criteria of social efficiency that take into account the expected contribution of state program implementation to social development, the indicators of which cannot be (or can be hardly) expressed in monetary terms.

The assessment of planned efficiency of a state program is performed by a responsible executor at the stage of its development and is carried out in order to assess the planned contribution of state program results to the socio-economic development and from the lens of national security of the Russian Federation.

The efficiency of the implemented state strategy should be determined according to the following formula:

$$EfS = \frac{TRDS}{CDS},$$  \hspace{1cm} (3)

where:
- $EfS$ is the efficiency of strategy (actual or planned);
- $TRDS$ is the target result of development strategy (actual or planned);
- $CDS$ is the cost of development strategy implementation (actual or planned).

The presented formula (3) looks simple, but only at first glance. A more in-depth analysis reveals the complexity of its practical application. The difficulties that arise when trying to determine the efficiency criteria of the strategy for human capital development in the agrarian sector include the following:

- multicomponent nature of strategy results, which is due to the complexity of human capital system in the agrarian sector. This complicates the final calculation and comparison of different effects and costs of various types of resources;
- multipurpose nature of strategy results, which implies an organic unity of achievement of political, economic and social effects. Their value or priority of achievement cannot always be determined in terms of reliable quantitative measurement;
- specificity of the Agro-Industrial Complex (AIC), which imposes a significant restriction on the development of human capital potential in the agrarian sector due to the presence of a large number of inherent limitations and risk;
- different interpretations of the value of beneficial effect from the implementation of development strategy;

4. Conclusion

The starting point for determining the methodology for assessing the efficiency of strategy for human capital development in the agrarian sector is the identification of strategic goals and their use as the basis for establishing intermediate and final target indicators [16].

On the whole, the main goal of all adopted and developed state strategies and programs of various levels (federal, regional or municipal) is to ensure an increase in the level of satisfaction of a certain need of the society in a specified value within a strict time limit.

The state, represented by certain departments, determines the society’s request for changes and develops a set of specific measures based on the limited availability of budget allocations for their implementation.

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