The role of human capital in the development of agribusiness

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Abstract. At the present stage of forming the sustainable rural areas development, the priority is to increase the level of human capital. Despite the dynamic development of agro-industrial complex, the advancement of rural areas is uneven, some of the territories lose their development, the population ageing processes are accelerating, and the outflow of young people is increasing. Attraction and retention of human capital in rural areas will allow to solve the priority tasks on acceleration of agriculture modernization as well as the development of entrepreneurial initiatives.

1. Introduction
All the arguments listed above require a scientific and methodical approach to the strategy development for the human capital development.
The level of human capital is directly determined by the current socio-economic situation at the level of municipal entities at large.

The evaluation of the rural development system allowed to define the socio-economic potential which is required to support the adaptation processes in the rural areas to changes, meeting the requirements of the Sustainable Development Concept [1].
The integrated assessment of the sustainable rural development will provide the opportunity to compare the municipal entities that are different in population and will also enable to compare the indicators with the territory reference parameters.

2. Results and discussion
In order to ensure the reliability of the estimate indicators the rural territories of Krasnoyarsk krai were divided into the groups by population size. In total, the four groups of rural areas were identified: the especially large one which population varies from 35000 to 50000 people; a large group with the population from 20000 to 34999 people; a medium-sized group amounting the population from 10000 to 19999 people and the small with the population from 1000 to 9999 people.

For each group the selected indicators of sustainable rural development were calculated.
The indicators characterizing the socio-economic situation of rural areas were chosen as the calculated ones. The economic development of municipal entities allowed to determine the following indicators: the number of small and medium-sized businesses per 10 thousand people; agricultural products (in actual prices); the average monthly salary of the organizations’ employees.
The complexity and versatility of the social infrastructure has defined the need to group the indicators in different areas such as health care, housing, culture and sport.
In the health care sector the number of treatment and prophylactic organizations per 1 thousand residents was taken as an indicator; in the housing sector - the total area of residential premises per person on average; in the sphere of culture and sports - the number of cultural and leisure-type organizations per 1 thousand residents.

\[ X_{ni} = \frac{X_i}{X_{max}}, \]  

(1)

where \( X_{ni} \) – is the value of the i-th indicator;  
\( X_i \) – is the standardized indicator for the i-th municipal entity;  
\( X_{max} \) – is the maximum value of the indicator in the group of rural settlements.

Here is an example of indicators calculation of sustainable rural development for especially large municipal entities.

**Table 1.** Assessment of the social infrastructure indicator by category «healthcare».

| Municipal entities | Number of people | Number of treatment and prophylactic organizations | Number of treatment and prophylactic organizations per 1 thousand people | \( X_{max} \) | \( X_{i1} \) |
|-------------------|------------------|-----------------------------------------------|-------------------------------------------------|----------|----------|
| Berezovsky        | 40789            | 16                                           | 0,39                                            | 0,94     | 0,42     |
| Boguchansky       | 45458            | 22                                           | 0,48                                            | 0,94     | 0,51     |
| Yemelyanovsky     | 48387            | 33                                           | 0,68                                            | 0,94     | 0,72     |
| Kuraginsky        | 45644            | 43                                           | 0,94                                            | 0,94     | 1,00     |
| Taimyrsky Dolgan-Nenets | 32580 | 4                                              | 0,12                                            | 0,94     | 0,13     |

In the group of rural territories with the population from 35000 to 50000 people by category "health care", the Kuraginsky district as a reference one was found as the most advanced provided with the number of treatment and prophylactic organizations.

The next indicator of the socio-economic development of the rural areas was chosen the indicator of housing provision to the population.

In the group of territories belonging to particularly large rural areas, the provision of residential space in most areas is higher than the normative value. The exception is the Taimyr Dolgan-Nenets municipal district where the value of this indicator varies at 0.95 (table.2).

**Table 2.** Housing provision indicator.

| Municipal entities | Number of people | Total area of residential premises, \( m^2 \) | Housing provision, \( m^2/\) per person | \( X_{max} \) | \( X_{i2} \) |
|-------------------|------------------|---------------------------------------------|----------------------------------|----------|----------|
| Berezovsky        | 40789            | 884000                                      | 21,67                            | 20,1     | 1,08     |
| Boguchansky       | 45458            | 1073600                                     | 23,62                            | 20,1     | 1,17     |
| Yemelyanovsky     | 48387            | 1511900                                     | 31,25                            | 20,1     | 1,55     |
| Kuraginsky        | 45644            | 1055500                                     | 23,12                            | 20,1     | 1,15     |
| Taimyrsky Dolgan-Nenets | 32580 | 625100                                      | 19,19                            | 20,1     | 0,95     |

The assessment of social infrastructure in the field of culture and sports allowed to make the following conclusions presented in table 3.

**Table 3.** Provision of municipal entities with cultural and leisure-type organizations.

| Municipal entities | Number of people | Number of cultural and leisure-type organizations per 1 thousand people | \( X_{max} \) | \( X_{i3} \) |
|-------------------|------------------|-------------------------------------------------|----------|----------|
| Berezovsky        | 40789            | 0,17                                            | 0,83     | 0,21     |
| Boguchansky       | 45458            | 0,64                                            | 0,83     | 0,77     |
In the sphere of culture and sports the Kuraginsky and Boguchansky districts reached the highest level of cultural and leisure-type facilities provision (in these districts there are 0.83 and 0.64 cultural and leisure-type organizations for 1 thousand residents, respectively).

Let’s consider a group of indicators of the rural economic development.

**Table 4.** Estimation of the economic development indicator in number of small and medium-sized entities.

| Municipal entities          | Number of small and medium-sized entities per 10 thousand people of the population | \( X_{\text{max}} \) | \( X_{i4} \) |
|----------------------------|----------------------------------------------------------------------------------|----------------|----------------|
| Berezovsky                 | 314,5                                                                            | 314,5           | 1,00           |
| Boguchansky                | 299,0                                                                            | 314,5           | 0,95           |
| Yemelyanovsky              | 300,9                                                                            | 314,5           | 0,96           |
| Kuraginsky                 | 215,1                                                                            | 314,5           | 0,68           |
| Taimyrsky Dolgan-Nenets    | 252,7                                                                            | 314,5           | 0,80           |

In the group of rural areas with the population from 35,000 to 50,000 people, the Berezovsky District was accepted as a benchmark by the number of small and medium-sized entities.

In the group of districts belonging to particularly large rural areas, the maximum indicator of the agricultural output (in actual prices) is 1910451 thousand rubles (table 5).

**Table 5.** Manufactured products indicators (in actual prices).

| Municipal entities          | Volume of production (in actual prices, thousand rubles) | \( X_{\text{max}} \) | \( X_{i5} \) |
|----------------------------|--------------------------------------------------------|----------------|----------------|
| Berezovsky                 | 1510093                                                | 1910451         | 0,79           |
| Boguchansky                | 7978                                                   | 1910451         | 0,00           |
| Yemelyanovsky              | 26523,9                                                | 1910451         | 0,01           |
| Kuraginsky                 | 1910451                                                | 1910451         | 1,00           |
| Taimyrsky Dolgan-Nenets    | 189891                                                 | 1910451         | 0,10           |

The average monthly wages remain below the regional average which is confirmed by the data presented in table 6.

**Table 6.** Average monthly wages of agricultural workers.

| Municipal entities          | Average monthly wages of agricultural workers, in rubles | \( X_{\text{max}} \) | \( X_{i5} \) |
|----------------------------|--------------------------------------------------------|----------------|----------------|
| Berezovsky                 | 28417,5                                                | 28417,5         | 1              |
| Boguchansky                | 26523,9                                                | 28417,5         | 0,933365004    |
| Yemelyanovsky              | 27968,1                                                | 28417,5         | 0,984185801    |
| Kuraginsky                 | 15065                                                  | 28417,5         | 0,530131081    |
| Taimyrsky Dolgan-Nenets    | 8094,8                                                 | 28417,5         | 0,284852644    |

Poverty in rural areas of Krasnoyarsk krai makes up 30% therefore, this phenomenon remains widely spread destroying the labor and genetic potential of the rural territories not only on cash income, but on disposable monetary resources as well. The main causes of poverty are low wages, the lack of work in the rural areas, drunkenness of the rural population and unwillingness to work [2].
The calculated integral index of the level of a municipal entity sustainable development varies from 0 to 1. According to the aggregate estimate the rural territories were referred to the types of sustainable development, medium sustainability and unsustainable development.

According to the consolidated assessment of the situation in the social and labor sphere, the rural areas are characterized by a low standard of living. The problem of employment, incomes, living conditions of the rural population and social development of the rural areas is increasing. In order to form the economically sound priorities in the field of sustainable rural development as well as to promote the strategic alternatives for the actions, it is necessary to analyze the level of human capital as the main definition of its development.

Taking into consideration the specifics of the rural territories, we propose to use as the estimated indicators of human capital the following ones: life expectancy, completeness of education, the level of cash income and the level of entrepreneurial initiative in rural areas [3].

Let us calculate the index of life expectancy at birth of Krasnoyarsk krai rural residents according to the following formula 1, the results of the generalized estimate are presented in table 7.

\[ X_1 = \frac{(X_j - m_j)}{(M_j - m_j)} \]

where \( X_j \) is the actual life expectancy of rural population in the region; \( m_j \) is 25 years old; \( M_j \) is 85 years old.

«Life expectancy at birth» indicator connects the reproduction of human capital with the development of health care system. High quality and availability of medical services provide greater economic efficiency in the use of human potential. According to the Analytical Bulletin of the Federation Council’ data, the number of visits to rural doctors in 2016 increased by 2.5%. As a result of the rural health care reform, the network of treatment and prophylactic institutions in the rural territories which are the independent legal entities has drastically decreased. During the process of enlarging the institutions many hospitals and outpatient clinics lost the status of a legal entity and became the structural units of larger institutions. The losses in the network of rural health care institutions are partly related to the closure of inefficient small medical establishments that impairs the residents’ access to medical services.

The reduction of health facilities network has led to a decrease in providing the rural residents with medical service per 10 thousand people and a gap increase on these indicators with the townspeople. With the reduction of the public health institutions network in the rural areas and, consequently, the decline in their territorial accessibility, the growth of this indicator testifies the deterioration of the health status of the rural residents.

There is a decline in the medical services quality in the rural areas of the Krasnoyarsk Territory, the majority local polyclinics are in district centers and the remote rural areas are not able to quickly and efficiently receive the medical care.

The index calculation of completeness of the rural population coverage by primary, secondary and higher education is based on the formula 3 and is presented in table 7.

\[ X_2 = \frac{(X_j - m_j)}{(M_j - m_j)} \]

where \( X_j \) is the actual level of the rural residents’ education; \( m_j \) is 0%; \( M_j \) is 100%.

Analyzing the data that determine the level of human capital development we can conclude that the education index growth is due to the stabilization of the population welfare, the increase in education investment. A positive trend is ensured by the fact that in the Krasnoyarsk region there is a large amount of educational institutions of higher and secondary education. Getting education by young people is seen as an opportunity to change their place of residence and gain a foothold in the city rarely returning to the countryside after the higher institution graduation.
where \( X_j \) is the average salary in the agricultural sector, rubles; 
\( m_j \) is the cost of living level, rubles.

The author has developed the index “the level of entrepreneurial initiative” as the estimated indicator of human capital development level.

\[
X_4 = \frac{(X_j - m_j)}{(M_j - m_j)},
\]

where \( X_j \) is an amount of organized enterprises;
\( m_j \) is 30% of unemployed involved in different entrepreneurial activities;
\( M_j \) is the number of unemployed of working age.

Table 7. The results of the quantitative estimation of human capital level of Krasnoyarsk krai rural territories.

| Estimated indicators                  | Year | \( X_j \) actual value | \( m_j \) minimum value | \( M_j \) maximum value | Indicator value |
|--------------------------------------|------|------------------------|------------------------|------------------------|----------------|
| Life expectancy of the rural population at birth |
| 2015    | 63,9 | 25                     | 85                     | 0,64                   |
| 2016    | 64,4 | 25                     | 85                     | 0,69                   |
| 2017    | 66,7 | 25                     | 85                     | 0,69                   |
| Completeness of education coverage of the district population |
| 2015    | 70,3 | 0                      | 100                    | 0,70                   |
| 2016    | 70,5 | 0                      | 100                    | 0,70                   |
| 2017    | 77,6 | 0                      | 100                    | 0,77                   |
| Available cash incomes |
| 2015    | 8 593,4 | 5 191                 | -                      | 0,65                   |
| 2016    | 5      | 5 841                 | -                      | 0,64                   |
| 2017    | 10 428 | 6 557                | -                      | 0,59                   |
| The level of entrepreneurial initiative |
| 2015    | 28,53 | 4913,95               | 16375                 | 0,44                   |
| 2016    | 35,1  | 4719,7               | 15732,3               | 0,43                   |
| 2017    | 44,8  | 4672                 | 15573                 | 0,43                   |

According to the results of quantitative and qualitative assessment of the human capital level, the municipal entities of rural areas were ranked and based on the obtained rating the types of rural areas with high, medium and low levels of human capital were identified [4].

The development of a mechanism for the human capital development in the rural areas implies a preliminary selection of alternatives that takes into consideration the type of rural areas. To form the economic mechanism, it is proposed to use the tools of morphological analysis, the essence of which is to build a matrix filling it with possible alternative options for the formation of sustainable rural development of Krasnoyarsk krai (table 8).

Table 8. Morphological matrix by types of rural territories.

| Type of rural territories by the level of human capital | Type of rural territories on sustainable development |
|--------------------------------------------------------|-----------------------------------------------------|
| Low          | Unsustainable | Medium-sustainable | Sustainable |
| Increased availability of medical services.          | Development of the program aimed at obtaining by     | Development of cooperative forms;                  |
|             | Prophylactic medical examination of the settlements’ population remote from the district centers | residents the higher and secondary vocational education in correspondence and distance learning | diversification of the rural economy |
| Medium-sized |                   | Improving the skills of agricultural organization leaders in the field of | Rendering assistance in development and |
| Development of geographically separated              |                                                     |                                                     |                                                     |
Increasing the level of human capital in the rural areas is possible through the intensification of entrepreneurial initiatives, namely through the development of a cooperation cluster. The objectives for the agribusiness development will be fully achieved at the expense of the cooperative forms of interaction between the rural residents as well as the revitalization of local authorities in support of the entrepreneurial initiatives [5].

3. Conclusion
The partnership relations algorithm of cooperation with the state structures and business will function at the expense of the presented model of the organizational and economic relations: the state authorities will act as a guarantor for the obligations of the cooperative to business structures. Attracting the investors will enable to increase the cooperatives profitability. The municipal authorities will provide support in economic and legal issues of the cooperative organization. It is proposed to introduce an important infrastructure link in the relationship system – a logistics center which will collect the information on possible product sales channels. The participation of agricultural organizations in the cooperatives activities is made by means of using the empty production facilities and land. The participation of the educational module and business incubator in the relationship system will ensure the cooperation with information and consulting services, qualified personnel and will also contribute to the innovative processes implementation in the agro-industrial complex [6].

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