

## Methodological aspects for the assessment of the state and use of human capital

*The article is devoted to the efficient use of human capital. It describes the methodical approaches of Russian and foreign scholars to the category of "human capital". The article gives an author's interpretation of human capital and reveals its main components. Besides, it provides the criteria and indicators for assessing the state and use of human capital of the agricultural organizations. The authors describe a tested mechanism to enhance employees' motivation for highly productive labor based on the study of staff motivational complex.*

*Human capital, intelligence, motivational complex, agriculture, intensification, labour quality, heavy-producing labour.*



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New trends observed in recent years in the world economy in general, indicate the emergence within the limits of the fifth technological wave of the elements of the sixth, which is manifested in the increasing accumulation of new knowledge and information technology, the active use of innovations in current

socio-economic process. Development of innovations, application of complex technological processes and creation of new products require highly qualified personnel and conditions that will allow an intelligent person to discover and apply his/her creative abilities and competence.

Thus, an employee as a subject of the innovative actions being integrated into the economic system becomes a crucial link in the knowledge economy, having a direct impact on the course of its development through the power of his/her intellect. An individual, capable of generating innovations, and obtaining methods of their successful implementation, is becoming a strategic resource in the development of an organization, a firm, an enterprise.

Scientific research points out that in the course of the last centuries there has been a tendency towards the increase of human capital share in the structure of aggregate capital in world economy.

If in the beginning of the XIX century, the share of human capital equaled about 20 – 30%, and the share of physical capital equaled 70% and 80% respectively, by the beginning of the XXI century the situation witnessed drastic changes. Now human capital prevails in the structure of the aggregate capital. It is the main determining factor of development [3].

The Human capital theory describes human capital as a set of production capabilities. So, Lester Thurow wrote that “the human capital represents people’s ability to produce goods and services” [11]. In such a case the production capabilities are divided into “natural”, i.e. intrinsic, reflecting the individual peculiarities of the personality, not reducible to knowledge and skills, and “economic”, formed in the course of living as a result of investments into human capital.

Of course, natural capabilities have a significant impact on the individual’s educability, while economic capabilities determine the growth and reproduction of already existing human capital and help an individual acquire new different kinds of knowledge. As a result, the same resources, aimed at the production of human capital, can form the human capital of a different size and structure in different individuals.

Nevertheless, one fails to make a clear distinction between “natural” and “economic” capabilities, which significantly hampers the evaluation of human capital as the stock of production capabilities.

We consider that the notion of “human capital” should not be regarded only as a set of knowledge, abilities and health or be identified with human investment. According to Theodore Schultz, the Nobel Prize winner of 1979, human capital is “valuable qualities acquired by an individual that can be intensified by the appropriate investments” [12]. Gary Becker, another Nobel laureate of 1992 defines human capital as “a fund of knowledge, skills, motivations that every individual possesses. Education, professional experience accumulation, healthcare, geographic mobility, information search can be invested in it” [1].

Ye. Grishnova, one of the Russian scientists, defines human capital from the viewpoint of integrated approach as “economic category, describing a set of production capabilities personality traits and motivations formed and developed as a result of investment. This set is used in economic activity, contributes to the growth of labor productivity, and thereby influences income increase of an individual as well as of a country [4].

Summing up the methodological approaches of a number of foreign and Russian authors (G.Becker, T. Schultz, S.Fischer, E.A. Grishnova, V.M. Galperin, etc.), one can divide all the definitions of human capital into two groups, considering it, firstly, as a set of available human reserves, abilities and qualities that are applied in the production of values, and, secondly, as an investment component, emphasizing the fact of investing in an individual. In this perspective it seems appropriate from the position of a system approach to define human capital as a set of intellectual, professional, psychological, physiological and socio-cultural characteristics (*fig. 1*) that contribute to the labor productivity increase and profit making and ensure the growth of employees’ incomes.

The methodological provisions stated above allow to:

- 1) formulate a conception of a multi-component structure of human capital and the need for personification of abilities and qualities;
- 2) express solidarity with the opinion of some researchers (G. Becker, M. Blaug, V.M. Galperin, E.A. Grishnova, A.I. Dobrynin, M.M. Kritskiy, P.M. Perushkevich, L.G. Simkina, I.V. Soboleva, L. Thurow, I.G. Ushachev, T. Schultz, etc.) who state that such economic categories, as labour and labour force defined in the human capital theory by Russian and foreign scientists (A.A. Bogdanov, E. Denison, J. Kendrick, K. Marx, A. Marshall, J. Mintzer, W. Petty, A. Smith, S.G. Strumilin, S. Fischer, etc. are narrow for the expression of a man's role in the innovation economy [2, 7, 10].

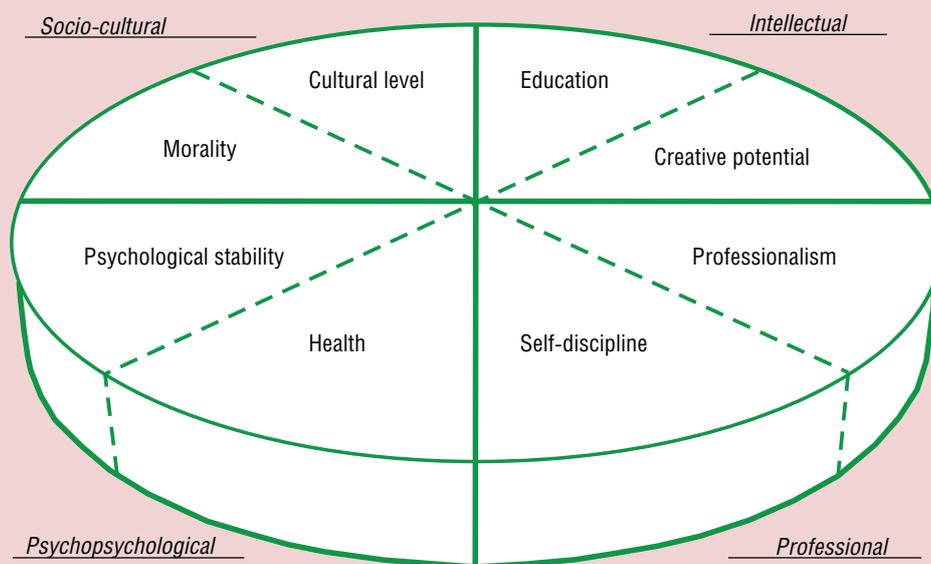
V.A. Medvedev points out that "labour force is gradually losing its traditional characteristics of a good" when the disadvantaged sellers of labor force, keeping intact the form of wage labor relations, transform them "in the direction of contractual cooperation aimed at the use of production resources, the human capital in particular" [9].

Thus, two notions are apparent: firstly, the limitation in estimations of human capital as the stock of production capabilities and, secondly, the need for profound examination of the factors of the human capital competitiveness.

Nevertheless, up to the present day the peculiarities of developing such important components of human capital as skills and intelligence that form indicators of professionalism and, accordingly, factors determining the growth of knowledge funds and innovation level are still not thoroughly explored. Most analysts regard human capital as a resource of innovative development only in the aspect of management personnel and scientific-research specialists training in the field of innovation activities. However, this unreasonably narrowed approach does not correspond to the notion of human capital as a form of the expression of human potential.

Since 1990 the UN publishes an annual report concerning the Human Development Index (HDI), which reflects the goal of public progress. The index is calculated on the basis of minimum set of core indicators that are regularly calculated using a comparable methodology for different countries.

Figure 1. The main components of the human capital



The core indicators include:

- ◆ the average life expectancy at birth, characterizing the health of population (according to the Constitution of the World Health Organization health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity);
- ◆ the literacy rate at the age of 15 and older, as well as the indicator of education scope in all types of educational institutions;
- ◆ GDP per capita.

Probably, it does not take a large number of arguments to show the obvious limited character and lack of the above mentioned indicators for developing the full-scale characteristics of human capital.

Practical methodologies of human capital analysis and evaluation (E. Flemholtz, V.I. Malyuk) do not take into account the influence of psycho-physiological and socio-cultural components of human capital, which also complicates the substantiation of effective mechanisms of personnel motivation and stimulation.

As the study of literary sources proves, the issues concerning the estimation of a state of human capital, efficiency of its response, determination of the ratio of expenses for creating human capital and for producing goods, are not properly highlighted in spite of the fact that human resources quality in the economic system is the main factor that ensures the effectiveness and the growth of a national economy, including agriculture. The statistical indicators reflect mainly the use of labor resources and do not reveal the contradictions between, for instance, an employee's high level of qualification (skill) and low interest (desire) to realize this ability to the fullest. Here the most important problem of methodology of human capital management in an innovation-oriented economic system is the creation of tools for assessing the quality of human capital and efficiency of its use in an economy.

In this connection a set of criteria and indicators for the assessment of the state and use of human capital in agricultural organizations is given below (*tab. 1*)

The set of indicators stated above can be used by management for monitoring the status and trends of human capital usage in agricultural production. Consequently, there is a possibility of identifying the dynamics of human capital characteristics and revealing the positive and negative trends in its development. This will allow to ground and make timely administrative decisions concerning the effective use of human capital.

Many researchers have grounds to believe that the solution of the problems concerning the development and increase of efficiency of use of human capital is connected with the improvement of professional training and the quality of education. Having undergone radical changes, the socio-economic situation in Russia allows to identify a number of specific factors that determine the necessity of improvement and increasing the efficiency of the model of specialists' preparation, first of all to the transition from the continuous system of a large number of training courses to the two-level system: bachelor's degree – master's degree. It is necessary to point out the barriers, hindering the development of a modern system of continuous professional education in Russia.

“Barriers” – are not the phenomena, contradictions and risks, which may become obstacles on the way of formation of the continuous professional education system as a basis of formation of the innovative and at the same time educational (education as the basis of innovative development of the economy) economy within the framework of Russia's innovative socio-economic development for the next 20 years [13].

These include the following types of barriers: educational, social, economic, territorial, administrative, organizational, legal, and spiritual-cultural. Let us describe some of them.

*Social barriers*

Expansion of the zone of human capital degradation. This concept means a complex social phenomenon, which consists of a number of interrelated processes, including:

- depopulation and first of all decrease in the number of able-bodied population;
- deterioration of the health of population, self-destructive behavior (alcoholism, smoking, drug addiction);
- increase in the number of disabled people;

- decline of the labor morals and ethics;
- loss of “moral depreciation” of qualification and education;
- lack of opportunities or desire to get a modern education, improve one’s qualification or get practical retraining.

These processes have been developed in significant social groups and territories.

The results of numerous studies confirm that such resources as cultural and social capital of a student’s family are extremely important from the point of view of accessibility of high-

Table 1. Criteria and indicators for the assessment of the state and use of human capital in agricultural organizations

	Criteria			
	Intellectual	Professional	Psychophysiological	Socio-cultural
Indicators for the assessment of the state of human capital	1. Average duration of training, years 2. Share of employees with higher education in the total number of employees, % 3. Number of employees with knowledge of foreign languages, pers. 4. Number of rationalization proposals per year, pcs. 5. Average I.Q., points 6. Number of employees with business communication skills, pers. 7. Number of applications in information consultancies, pcs.	1. Total duration of professional training, years 2. Experience of work in agriculture, years 3. Coefficient of saturation with specialists, % 4. Frequency of improvement of professional skills, times a year 5. Number of employees that have completed courses of improvement of professional skills for the last 5 years, pers. 6. Costs of improvement of the qualification of the employees, RUB/person per year 7. The share of workers with specialized secondary education in the total number of employees, %	1. Costs of health provision and improvement of the working conditions of employees, RUB/person per year 2. Share of expenditure on health maintenance and improvement of working conditions in the total expenditure, % 3. Coefficient of accidents at work 4. Coefficient of accidents severity at work 5. Total loss of working time due to incapacity for work, days 6. Average age of the employees of the organization, years 7. Number of employees with chronic diseases, pers.	1. The average income of workers, RUB 2. Specific weight of dismissal for violation of labor discipline, % 3. Expenses for the cultural development of an employee, RUB./pers. (total and including an employee’s own expenses) 4. Specific weight of young people in the total number of employees, % 5. Specific weight of persons of retirement age in the total number of employees, % 6. Provision with cultural institutions per 100 employees, pcs. 7. Extent of job satisfaction, %
Indicators of the use of human capital	1. Number of inventions, patents, innovations per employee, on the whole and pcs/pers. 2. Own-product real wage, RUB/RUB 3. Number of targeted programs (projects) in which an organization participates, pcs. 4. Amount of innovative technologies used in an organization, pcs.	1. Losses from defects per one employee RUB/pers. 2. Losses from defects in total amount of losses, % 3. Coefficient of return of the money spent on the improvement of the qualification of employees 4. Labor intensity of production, man-h./unit of production 5. Goods produced per 1 man -h., items of products	1. Coefficient of utilization of working time 2. Product losses due to diseases and injuries per one employee RUB/pers. 3. Product losses due to diseases and injuries in the general losses of production, % 4. Coefficient of return of the money spent on the provision of health 5. Coefficient of working capacity	1. Employee turnover rate 2. Losses due to conflicts per one employee RUB/pers. 3. Losses due to conflicts in the general losses, % 4. Losses from breaches of discipline per one employee RUB/pers. 5. Losses from breaches of discipline in the general losses, RUB/pers.
	Labor productivity Received profit per 1 man-hour, RUB.			

quality education. First of all, education of parents, their employment sphere and position, size and composition of a student's family (two-parent or single-parent families, the number of brothers and sisters) should be defined among the socio-cultural factors of the accessibility of quality education.

Urban alienation of rural youth from the native rural society. The gap between the quality of education in rural and urban education systems, the phenomenon of "non-return" of rural youth, having graduated from the big city universities, leads to the degradation of the rural population quality and reduction of population in Russia's rural regions, especially Central areas, the Northern Non-Black Earth Region, Siberian regions and Northern territories. Now there is an imperative of establishing a system of continuous education in the rural society of Russia on the basis of creating a network of rural universities taking into account the noosphere and biosphere status of a region and the peculiarities of agricultural nature management in these regions.

In the first place we speak about careless and sometimes openly indifferent attitude to man of labor. Problems of professional education, personnel policy, employment and unemployment have been thrown out on the periphery of the economic and public consciousness in general. The negative consequences of such underestimation of human capital are evident everywhere. This is expressed, for example, in the reluctance of the administrations of many enterprises to pay serious attention to the training of qualified personnel because they hope to solve the problem by bringing back the "old" staff or attracting workers from CIS countries.

Meanwhile the dependence of labor opportunities expansion for employees on their state of health and safe working conditions, on the development of creative activity and initiative, on the level of organization and discipline, on the expansion of employees'

participation in production management and other forms of manifestation and development of abilities of personnel has not been definitely expressed in analytic calculations.

A concept of human capital effective use and management, which is based on the increasing role of an employee's personality, knowledge of his/her motivational aims, management ability to form and direct them towards the achievement of a company's goals is essentially required.

This study which deals with the problem of efficiency increase of human capital usage in agricultural organizations reveals the peculiarities of agricultural workers' motivation conditioned by a particular social structure, by norms of behavior characteristic only of rural population and by closeness of nature as applied to the conditions of the Ryazan Oblast. Taking into account the peculiarities stated above, we have divided labor motivations of a worker into inner and external (*fig. 2*).

The content of motivational aspirations of the workers was expressed and compared taking into account the objectives of management aimed at the creation of rational administrative impact on the personnel. For this purpose the workers of certain enterprises were divided into groups on grounds of the significance of motives, defined on the basis of questionnaire survey. Received combinations of elements of the motivational complex have been matched with groups of workers as follows:

1. High level of motivational complex:

$$M_1 > M_3 > M_4 > M_2; M_1 > M_4 > M_3 > M_2; \\ M_1 > M_3 > M_2 > M_4$$

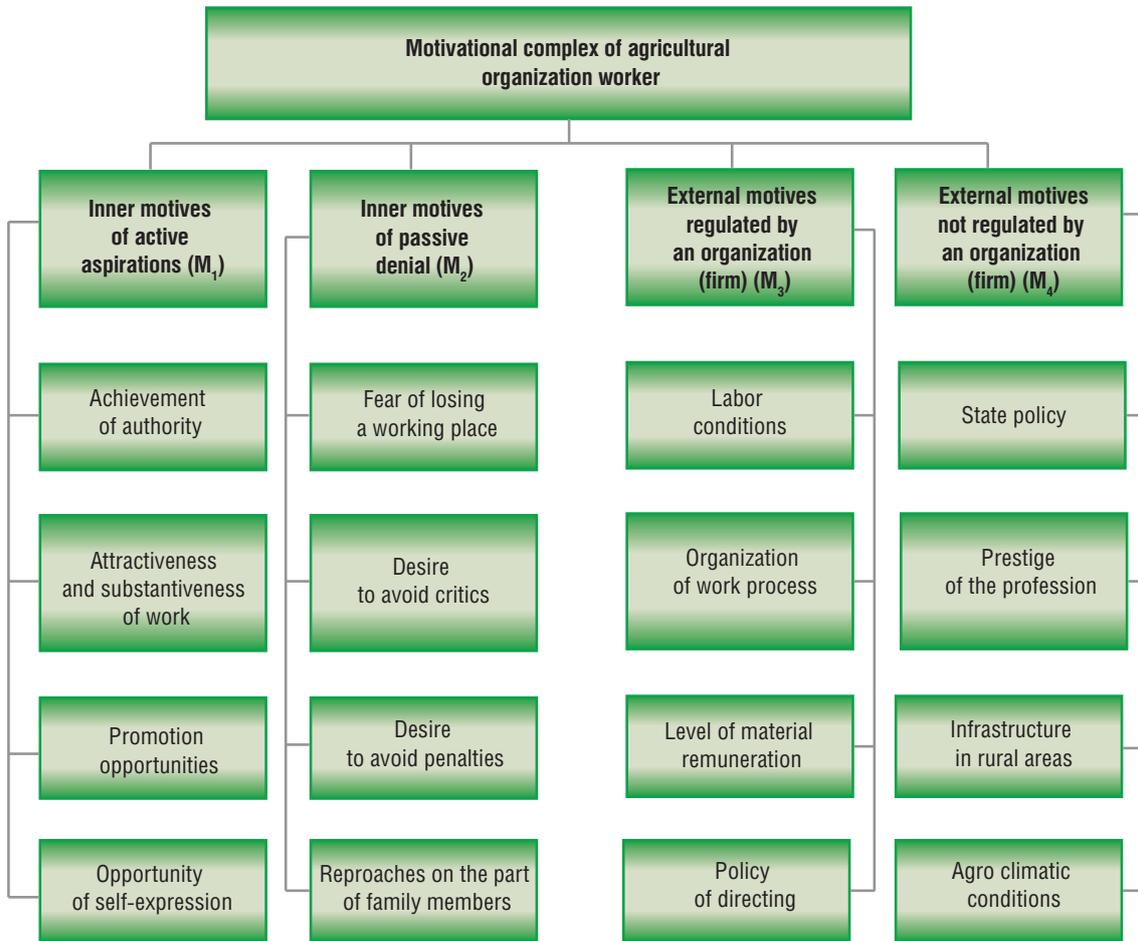
2. Medium level of motivational complex:

$$M_3 > M_1 > M_2 > M_4; M_3 > M_1 > M_4 > M_2; \\ M_3 > M_2 > M_1 > M_4$$

3. Low level of motivational complex:

$$M_2 > M_3 > M_1 > M_4; M_2 > M_3 > M_4 > M_1; \\ M_2 > M_4 > M_3 > M_1$$

Figure 2. Motivational complex of agricultural organization worker



The first group of workers with high motivational aspirations, is characterized by the predominance of moral factors (social recognition of the activity, possibility of self-expression, etc.). Such employees should be assigned the work, which requires high labor quality, mainly determining the final results.

For the second group of workers of top priority are financial motivation factors, that's why they should be assigned the work, that has a clear connection between the results of the work and the payment for it and it is necessary to ensure high labor performance.

Workers of the third group are characterized by weak response to the factors of financial motivation. It will be reasonable to provide them with the work, which does not have a direct impact on the final results of the organization's activity (the auxiliary and servicing of production).

In the Ryazan Oblast the workers of agricultural organizations consider the level of financial stimulation to be the main motive of job satisfaction. It is confirmed by the questionnaire survey data, according to which more than 70% of the respondents consider the amount of payments to be the main work motivation.

The majority of maintenance workers on cattle farms, milking machine operators and tractor drivers have a medium level of motivational complex. Given their economic interest, it can be noted that the application of bonus systems closely connected with the results of the work and the quality of products is the best way to increase the efficiency of human capital usage.

Thus, workers of agricultural organizations who have a medium level of motivational complex, are mainly responsible to the impact of financial stimulation motive.

The generalization of the questionnaire survey results allows to orient the system of material remuneration towards a differentiation of workers' labor estimation according to their contribution to the overall success of the organization with regard to quality of the executed works.

Besides, the indicator of an individual employee's contribution should be considered not only as an index, which reflects the quantitative assessment of an individual worker's labor participation rate in the overall results of work of a structural division (Index of Labor Distribution (ILD), but also as a component of motivational complex. In this respect, the study introduces and approbates the "coefficient of the use of the human capital" (CUHC), reflecting the worker's role in the ultimate (or interim) results of the structural division's activities as well as the quality of the executed works.

In order to determine the value of the coefficient of the use of the human capital it is necessary to perform estimation for all employees of a subdivision on a 10-point scale according to the following main criteria obtained as a result of experts' polling.

$P_1$  – assessment for the timeliness of the work, points,

$P_2$  – assessment for the quality of performed work, points,

$P_3$  – assessment for the labor discipline, points,

$P_4$  – assessment for the complexity of the performed work, points.

The total value of the assessment in points according to the proposed criteria is calculated in compliance with ILD and the weight coefficients of importance, received as a result of the survey of experts ( $P_1$  and  $P_2$  got the figure of weight coefficients of importance of 0,3, and  $P_3$  and  $P_4$  – 0,2) (tab. 2).

$$P_{total} = ILD \times (0,3P_1 + 0,3P_2 + 0,2P_3 + 0,2P_4)$$

$$P_1, P_2, P_3, P_4 \times [1;10]$$

$$K_{CUHC_i} = \frac{P_{totali}}{\sum_{i=1}^n P_{totali}},$$

where  $i$  is the index number of an employee of the structural division;

$n$  is the number of employees in the division.

When calculating the incentive payment to a worker several components should be taken into account:

- individual CUHC;
- the results of the work of the brigade (concerning planned figures of milk yield, crop productivity, quality of executed works);
- overall profitability of the organization.

Table 2. Data for calculation of the coefficient of the use of the human capital in agricultural organizations

Worker	ILD	Assessment, points				$P_{total}$	CUHC
		$P_1$	$P_2$	$P_3$	$P_4$		
1	2	3	4	5	6	7	8
1	$ILD_1$	$P_{11}$	$P_{21}$	$P_{31}$	$P_{41}$	$P_{total1}$	$CUHC_1$
2	$ILD_2$	$P_{12}$	$P_{22}$	$P_{32}$	$P_{42}$	$P_{total2}$	$CUHC_2$
3	$ILD_3$	$P_{13}$	$P_{23}$	$P_{33}$	$P_{43}$	$P_{total3}$	$CUHC_3$
4	$ILD_4$	$P_{14}$	$P_{24}$	$P_{34}$	$P_{44}$	$P_{total4}$	$CUHC_4$
5	$ILD_5$	$P_{15}$	$P_{25}$	$P_{35}$	$P_{45}$	$P_{total5}$	$CUHC_5$
6	$ILD_6$	$P_{16}$	$P_{26}$	$P_{36}$	$P_{46}$	$P_{total6}$	$CUHC_6$
7	$ILD_7$	$P_{17}$	$P_{27}$	$P_{37}$	$P_{47}$	$P_{total7}$	$CUHC_7$
$\Sigma$	1,00	-	-	-	-	$\Sigma P_{total}$	1.00

Judging by the results of the activity of an agricultural organization for the year it is proposed to create a special motivation fund on the basis of the consumption fund, the assets of which will be distributed according to the coefficient of the use of the human capital as follows: 25% goes to the reserve funds to cover the possible overexpenditure of the salary fund; 25% of the remaining sum goes to bonuses for executives and specialists, 75% to bonuses to workers.

Incentive payments can be made according to the results of the completion of production cycles (sowing, harvesting, etc.) in proportion to CUHC. In the case of the employee's absence from work for the period of 3 – 5 days per month the amount of the incentive payment is reduced by 25%, for the period of 10 days and more – by 100%. At the end of the year the reserve fund can be fully distributed among the employees of an organization.

Along with a set of instruments of the material motivation of labor it is advisable to use a socially oriented system of influence, which is created on the basis of subsidizing of a part of expenditures on the construction of houses for employees, the partial repayment of the housing debt or auto loan, etc.

It is also possible to sell the products of agricultural organizations of their own production to the employees at a reduced price (for example, meat or milk at a price slightly below the market one, taking into account the financial-economic potential of the organization, which increases the responsibility of the personnel for the quality of work). In this case, an employee will spend less time on household management, and therefore, have more rest and cultural development. It is important not to replace financial wages by wages in kind, and only provide the opportunity to employees to purchase the volume of products, not exceeding 50% of the amount of their nominal wages. If employees are given a greater amount of products, they will have to sell the surplus.

Approbation and introduction of the project developments aimed at the stimulation of employees' motives for high performance in the agricultural organizations of the Ryazan Oblast, belonging to different groups by the level of business attractiveness, showed, firstly, a positive effect from their implementation in the examined establishments, and, secondly, the best return from the introduction of the developments in groups with an average and low business attractiveness of agricultural production (*tab. 3*).

Table 3. Change of production output in agricultural organizations of the Ryazan Oblast according to the results of implementation of the mechanism of activation of the motivation of employees for high performance

Indicators	Goods produced in the calculation for 1 pers.-hour.		
	Grain. centners	Milk. centners	Cattle liveweight gain. kg
Collective farm enterprise "Zarya"			
Before introduction (2009 r.)	1.54	0.27	1.60
After introduction (2011 r.)	1.41	0.29	1.74
Index of change	0.92	1.05	1.08
Collective farm enterprise "Lakash"			
Before introduction (2009 r.)	2.00	0.29	1.99
After introduction (2011 r.)	1.89	0.31	2.13
Index of change	0.94	1.08	1.07
Collective farm enterprise "Svetly Put"			
Before introduction (2009 r.)	2.78	0.32	3.10
After introduction (2011 r.)	2.38	0.33	3.27
Index of change	0.86	1.03	1.06

In the examined agricultural organizations there was an increase in the milk production indicators and increase of live weight of cattle as calculated per 1 man-hour. Comparison of the dynamics of changes in production output in the organizations, where the introduction of developments aimed at the improvement of the mechanism of activation of employees' motivation to highly productive labor was implemented, and in the organizations, similar to them according to the chosen parameters (collective farm enterprise "Rodina", collective farm enterprise "Krasniy Mayak",

collective farm enterprise "Uspenskiy"), shows that, firstly, dynamics of production output has a better tendency: the rate of change in the output concerning the grain products is greater by 6 – 17 percentage points, milk – by 1 – 5 p.p., on a gain of live weight of cattle by 3 – 14 p.p.

Thus, the approbated motivational complex is positioned as an effective tool of increasing the impact of human capital facilitating production intensification, growth of production output in calculation per 1 man-hour and in general, the competitiveness of agriculture.

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